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*Illustrated.

THE study of operation on the Chesapeake & Ohio, the results of which are printed elsewhere in this issue, was undertaken without any idea that it might be particularly pertinent at this time to the question before the Interstate Commerce Commission. As a matter of fact the preliminary work of getting together figures was begun more than six months ago. The results, however, have a striking bearing directly on this inquiry. The Chesapeake & Ohio is in fine physical condition. The very fact that it had to do a lot of work to repair flood damage was taken advantage of to put roadway in thoroughly good condition, although the work was rather delayed. There is no congestion east of Cincinnati, and yet the C. & O. coal operators are suffering from "the inadequacy of railroad facilities"; in other words, the lack of railroad credit. Railroad credit depends on net earnings, not on gross; and, as in the case of the Chesapeake & Ohio, net may be abnormally reduced on a particular road, even when that particular road's facilities are ample, because of the lack of facilities on other roads.

NO movement in recent years has attracted the attention of railway engineers so generally as the valuation of railway properties now being undertaken by the government, and the response to the call of the Civil Service Commission for applicants for positions was most unusual both in the number and in the high standing of the men it drew out. Now that the preliminary grades have been announced and the Board of Engineers is engaged in the selection of men preparatory to making appointments, there is much discussion of the relative advantages and disadvantages of affiliation with this gigantic enterprise. The work has much to attract the railway engineer; and the government Board of Engineers will undoubtedly draw very heavily upon railway engineers in organizing its forces for men without the railway experience will be seriously handicapped. The problem is without precedent either in form or magnitude. The work is for the public, which will appeal to the sense of duty and public spirit of many. The experience gained will be valuable in a field certain to expand rapidly in the near future. The opportunity for a study of conditions on a number of roads as well as for gaining a wider acquaintanceship among railway and government officials, are also advantages. On the other hand, the engineer who is offered a position with this board may well stop to consider some of the obvious disadvantages. In the first place, while nearly all the applicants desire to secure the $4,800 positions, the number of positions paying this salary will be relatively small. In fact, it is understood that the Board of Engineers is now interrogating many applicants regarding the minimum amount they will accept. Another important objection is the uncertain tenure of position. While the work was originally intended to extend over five years, and if carried to completion will undoubtedly require considerably more time, the carrying out of the project is entirely dependent upon the will of Congress. It is generally believed by railway men that the valuation, if properly conducted, will in most cases show the values of the properties to be greater than capitalizations. In view of the general public impression to the contrary, the demand for valuation may diminish perceptibly if the first reports completed should show high valuations. It would be no unheard of thing under these conditions for Congress to fail to appropriate funds for continuing the work. The recollection of similar action regarding the Commerce Court is still fresh in mind. The similar discontinuance of valuation work in Kansas after a large part of the data had been collected is another case in point. Such a procedure is, of course, not anticipated at this time, but it is one of the possibilities which men considering such positions must bear in mind.

THE correspondence between a member of the Illinois legislature and the general counsel of the Chicago, Burlington & Quincy, discovered by the Interstate Commerce Commission in its general investigation of the pass situation, as reported in our news columns, in which the road was threatened with legislative retaliation because of its refusal to issue free transportation, forms an illuminating example of some of the difficulties encountered by the railways in their efforts to improve the conditions which have led to the public demand for regulation. State Senator Denvir has denied that he wrote the requests for transportation or the threat referred to and has sought to evade responsibility by calling the letters forgeries or a joke by some of his friends, although he has not explained how letters addressed to him at his home have fallen into the hands of the jokers, who wrote over his signature "when our committee gets through with you, you will find your road in the hands of a

receiver." However, whether or not Senator Denvir was the author of the letters, most railway men know that they are a fair sample of methods very frequently resorted to by public officials to hold up the railways for favors or more valuable considerations. Other roads have equally interesting collections of letters from politicians, which will doubtless be discovered by the commission in its investigation. It is not quite the usual thing for such threats to be expressed in letters, but similar verbal threats are not at all uncommon. A railway pass no longer possesses much purchasing power, but the refusal of a pass still involves possibilities of a great deal of trouble, and there have been very strong reasons for the failure of the roads to abolish state passes at the time interstate free transportation was made illegal. Moreover, there are still many legislators and other public officials who are not satisfied with passes, and who have frequently made it very expensive for railways to refuse their demands. It has been popular to place the blame for the corrupt relations that formerly prevailed between the corporations and the politicians on the corporations alone, ignoring the fact that for every bribe that was ever given there was some one to receive it, if he did not actually solicit or demand it. The public finally tried to remedy the situation by regulating the railways, but it has thus far made the mistake of leaving most of the power to regulate in the hands of the same men who previously, as legislators, had been practicing the gentle arts of bribetaking and blackmailing. This fact has been responsible for far more of the anti-railway legislation of recent years than most people realize. The railways have been obliged to clean house, and they have tried to proceed on the theory that "honesty is the best policy," but the people who tried to reform the railways have neglected to clean house themselves and have continued to elect to public office and to their law-making bodies the same kind of grafters and blackmailers that have been at least halfway responsible for the evils that the people were trying to eliminate. It is time the public realized that corrupt relations between business and politics are two sided, and therefore cannot be abolished by attacks on one side only.

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ON the Montana division of the Northern Pacific, the use of Form 31 for train orders has been entirely abandoned, except in cases where the superiority of the train addressed is restricted at the point where the order is delivered. This almost exclusive use of Form 19 has now been in effect for several months, and with marked satisfaction. That the movement of trains has been much facilitated goes without saying. On those portions of the road (single track) where the trains have the additional protection of automatic block signals, Form 19 is used even to restrict rights at the meeting point, Rule 211 requiring that, in such a case, the opreator shall stop the train before delivering the order. The only difference between Form 31 and Form 19 is that Form 31 must be acknowledged in writing by the conductor or engineman or both. The order cannot be acted on until the despatcher knows this. Getting signatures makes much delay. Many despatchers are firmly convinced that equal or greater safety can be secured without requiring signatures. In the interest of this view we are glad to reprint on another page, an editorial from the last issue of the *Train Despatchers' Bulletin*. The reader will recall that this subject was discussed at some length in the *Railway Age Gazette* last year.* The principal obstacle to complete agreement on the exclusive use of Form 19 appears to be the objection raised by Mr. Fay, of the Sunset-Central Lines, set forth in our issue of April 5, just referred to. This in substance is that the rule forbidding the giving of a restricting order at the point where the restriction takes effect is not a sufficient safeguard. Suppose that by time table schedules two trains are to meet at C. To hold the superior train there for the inferior train the despatcher, desiring to use Form 19, may not send the order to C, but may send it to the last preceding station B. This is on the assumption that the engineman will read the order after leaving B and before reaching C. But the distance and time may be so short that he cannot be depended on to do this invariably. But is not this condition readily met by having a third form, one requiring the train to be stopped but not requiring signatures? Or, with proper regulations, the three kinds of order can be regularly employed without having three (or even two) colors of blanks. Are we not in danger of elevating our forms to the dignity of a fetish? The "middle order"—sending meeting orders always to the operator at the appointed meeting place—is an important safeguard under any scheme of order forms. The most pervasive weakness of our train despatching is the spirit that puts up with partial adherence to standards which have been accepted as essential to a complete system. If the middle order is essential why do we not insist on it everywhere? If automatic signals make signatures or the middle order unnecessary why should they not also make written orders unnecessary, and thus save still more time? This, and other questions, not touched upon here, ought to be thrashed out and settled. All of the foregoing is, of course, addressed to those who have no block system (or who have one and do not dare to depend on it).

*March 8, 15, 22; April 5; June 7.

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## BRITISH COMMISSION TO STUDY NATIONALIZATION.

THE growing interest in the subject of railway nationalization is strikingly illustrated by the recent appointment in Great Britain of a royal commission to inquire into the relationship between the railway companies and the state "in respect of matters other than the safety of working and conditions of employment," and to report what changes, if any, in that relationship are desirable. The announcement comes almost simultaneously with that of the National Civic Federation in this country of its intention to undertake a national survey of social progress which will include a study of the question whether regulation of railways and other public service corporations is a failure, and whether state ownership should be substituted for that of private capital.

While the investigation of the British Commission is not to be confined solely to the question of nationalization, it is well understood that inquiry regarding that subject is its essential purpose. It therefore appears somewhat strange that the terms of reference should have so explicitly excluded safety of working and conditions of employment. In this country, until recently, most of the discussion of government ownership or operation of railways has originated with those who have professed to see in it a means of both increasing safety and improving working conditions, and it would seem that no serious and thorough consideration of the general question could ignore these matters. On the one hand, the muckrakers have manipulated statistics to convince uninformed readers that government railways abroad are uniformly safer than the privately owned lines of this country; and on the other hand, the socialists and near-socialists have deluded themselves into believing that the creation of 1,700,000 additional government jobs would herald the approach of the millennium for the working man. That railway nationalization would have a most vital effect on these two important phases of the transportation problem is beyond dispute, although the effect would probably not be a beneficial one. In fact, the demands of the labor unions have played a prominent part in the agitation of the subject in Great Britain.

A more impelling cause for the appointment of the royal commission, however, undoubtedly lies in the change in the financial condition of the British railways, which corresponds somewhat to recent changes in this country. It is notable that of late much of the more serious suggestion of the possibility of nationalization in this country has originated with railway men, inspired rather by fear that the government will soon have to relieve the private owners of a responsibility they may no longer care to bear for the reward offered, than by any opinion that such a step would be wise. This change in the character of the discussion

has come about from the economic condition into which the railways have been brought by a regulation of income downward, accompanied by, but disassociated from, a separate regulation of expenses upward under another set of laws. It is possible that the overshadowing financial aspect of the situation in Great Britain has been responsible for the exclusion from investigation of secondary features of the problem.

The make-up of the new royal commission is characteristically British. All of the members have held positions of responsibility and prominence in the business world or in public service, and have thus gained experience that might be expected to develop the kind of judgment required to decide such an intricate and weighty problem on its merits.

The chairman, the Earl of Loreburn, is a former Lord chancellor who was decorated for services in connection with the Venezuelan boundary arbitration. The other members include the Earl of Derby, formerly financial secretary to the War Office and postmaster general; Sir Henry Primrose, formerly chairman of the Board of Inland Revenue and chairman of the Board of Customs; F. Huth Jackson, late president of the Institute of Bankers; Sir F. R. Upcott, who has been consulting engineer to the Madras government railways, government director of Indian railways and chairman of the board of the Indian railways; Sir W. Plender, president of the Institute of Chartered Accountants and auditor to numerous railways in England; A. Balfour, managing director of Seebohm & Dieckstahl; R. E. Prothero, for several years editor of the *Quarterly Review;* and D. J. Shackleton, senior labor adviser to the Home office.

The railway press of England comments on the fact that the only practical railway man on the commission has gained his experience on the Indian railways, and that there is no representative of British railway methods; but confidence is expressed that the companies will be able to prove to the commission that the advantages of private ownership outweigh any benefits that might be derived from state ownership, and that the cost of purchasing the lines on fair terms would substantially exceed their large capitalization. A royal commission on railways appointed in 1865 reported two years later against the exercise by the state of its powers to purchase the railways.

## COUPLER AND DRAFT SILL REPAIRS.

THE complaint is often made that there is a much more rapid deterioration of railway rolling stock than there was a few years ago. Frequently, the cause is laid to defective material, but usually someone calls attention to the greater service and, incidentally, the severer stresses to which the present day car is subjected. It is, of course, the freight car that comes in for the greater part of this attention, and there can be no doubt that the damages inflicted upon it are very much greater than they were a few years ago, a statement that will be substantiated by an examination of the repair records of any railway.

One master car builder attributes this to four fundamental causes: the rapid introduction of heavy locomotives; the promotion of large numbers of firemen, inexperienced in locomotive handling, to the position of engineers; the use of heavier and stronger cars interspersed through a train of weaker and lighter ones; and the work of handling a dense traffic in heavy trains on single track, where much sawing to and fro has to be done at passing sidings. Any one of these causes would have an appreciable effect on car repairs, especially in such matters as broken drawbars and sills, but, when they are all combined, the cumulative result is one at which railway officers may well stand aghast.

Take the single item, perhaps as large as any, of couplers broken or pulled out. Four years ago this was not as serious as it is today. At that time on an ordinary road where the car mileage would run from 6,000,000 to 8,000,000 a month, the number of broken couplers would range from 25 to 100 in the same time; but these records showed a sudden and substantial rise about two years ago when locomotive weights took a leap ahead and traffic demands required the promotion of large numbers of men. The repair sheets now show from two to five times the number of broken or pulled out couplers. It would hardly be possible that any one of the four reasons given could be responsible for the whole increase, but each has contributed its quota to swell the figures to their present formidable proportions.

Strange to say the number of wheels used has, apparently, not been appreciably influenced by the causes that have had such a disastrous effect on couplers and sills. Records of some of the northern roads show that the number of wheels replaced has increased on the average in about the same ratio as the wheel mileage, with a regular annual spasmodic increase for the later winter months of February and March, due to the pounding action on a hard and unyielding roadbed that has been solidified by the frost. This indicates that the cast iron wheel is, at least, holding its own in the fight against the greater stresses to which it is subjected. But it will be noticed that not one of the four causes of destruction cited, that have such serious effects upon couplers and sills, has any effect whatever upon the wheels, with the single exception perhaps of the promotion of inexperienced men, and then only as they are affected by the application of the brakes.

What are the possibilities of decreasing this chronic destructiveness? It is probable that the records of car equipment on most roads will show a gradual elimination of the old cars of 20 tons capacity, so that in a year or so more they will have entirely disappeared. As for the 30-ton capacity cars, their numbers are too great to expect their immediate disappearance, but in some places when the center sills on the old cars are broken they are replaced by steel sills with the couplers and draft rigging attached as substantially as in all-steel cars, so that the practical elimination of the factor of weakness as indicated by use of strong and heavy cars in a train of light ones will disappear as a contributing element of destructiveness long before the 30-ton car will have itself ceased to figure on the equipment roll, if, indeed, that time ever comes; though, with the introduction of the heavier capacity cars, the actual number of 30-ton cars is decidedly on the decrease on some roads.

As for the 40-ton and 50-ton cars, their increase has been and still continues by leaps and bounds. Some roads are maintaining a nearly constant quantity of the one, while all new equipment is of the other. In these cars the weakness of the wooden underframing has disappeared and steel has taken its place either for the underframing alone or for the whole structure of the car. When this steel construction has replaced the old wooden construction to such an extent that it can be regarded as universal, then the third of the four elements will be done away with.

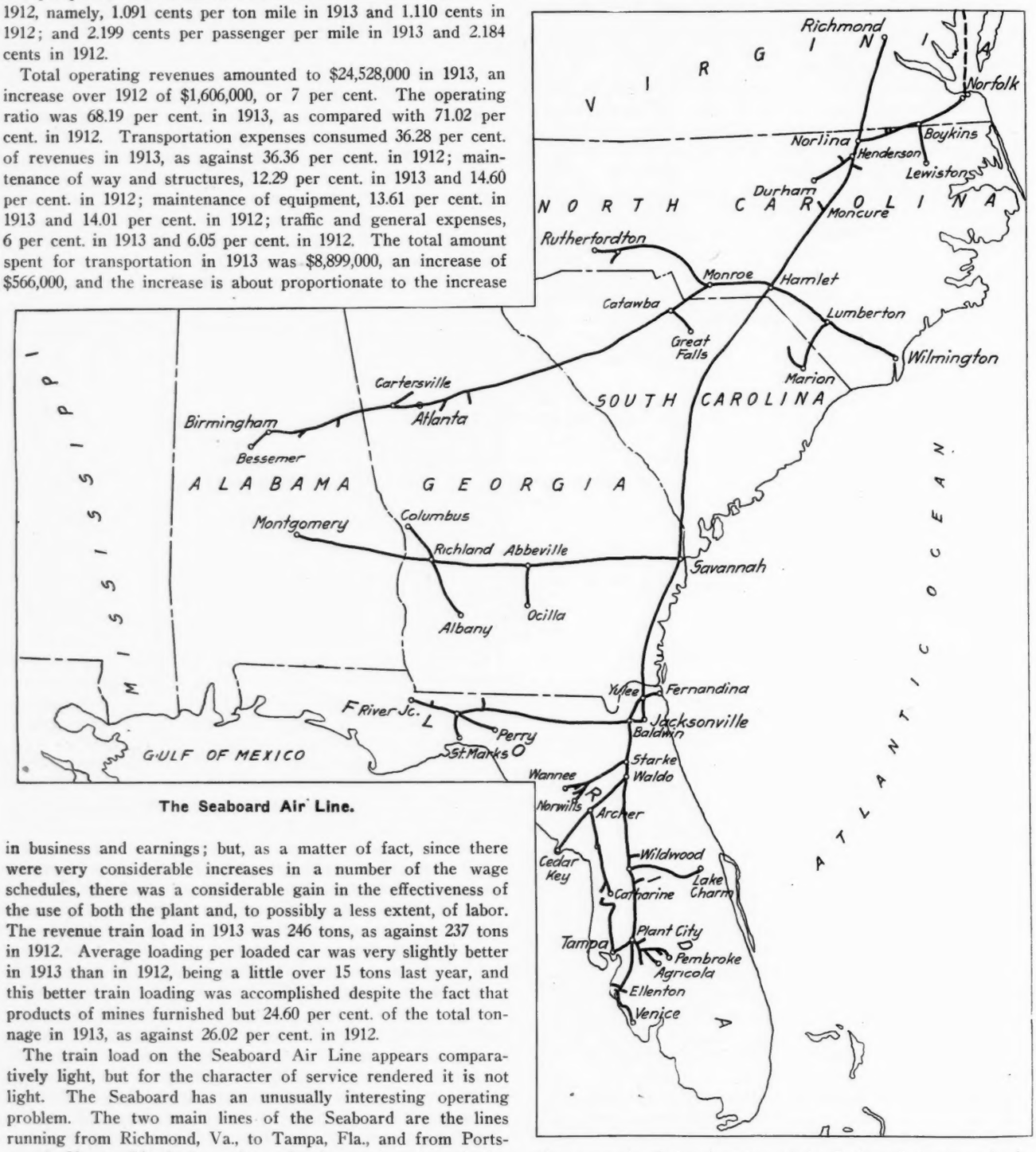
Whether the car can be made strong enough to withstand the normal stresses applied by the continually increasing locomotive power is a question that will undoubtedly be answered in the affirmative. It may involve the construction of heavier cars, but the strength to resist ordinary traction stresses will be found in the future, as it has been in the past, and experience and discipline, it is hoped, will make the engineer more careful in the handling of the train.

While the last item can probably never be entirely blotted out on a single-track line where stops and starts at passing sidings must be frequent, it can and will be greatly modified in its effects by the use of longer sidings and the obviating of much of the work that must now be done. It would, perhaps be too optimistic to expect that repair costs will ever drop back to the old figures of five or six years ago, but it seems more than probable that, when the general run of rolling stock has been adapted to the new conditions under which it must operate, the freight car repair bill will be reduced from its present proportions and take on an aspect that we have been in the habit of considering normal.

## SEABOARD AIR LINE.

THE Seaboard Air Line earned $1,736,000 net, after the full payment of 5 per cent. on its income adjustment bonds, in the fiscal year ended June 30, 1913, which is more than twice the net earned in the previous year. This gain in surplus, which amounted to $920,000, was the result of handling 10 per cent. more ton mileage and a little over 2 per cent. more passenger business without a proportionate increase in expenses. The receipts per unit of traffic were almost the same in 1913 as in 1912, namely, 1.091 cents per ton mile in 1913 and 1.110 cents in 1912; and 2.199 cents per passenger per mile in 1913 and 2.184 cents in 1912.

Total operating revenues amounted to $24,528,000 in 1913, an increase over 1912 of $1,606,000, or 7 per cent. The operating ratio was 68.19 per cent. in 1913, as compared with 71.02 per cent. in 1912. Transportation expenses consumed 36.28 per cent. of revenues in 1913, as against 36.36 per cent. in 1912; maintenance of way and structures, 12.29 per cent. in 1913 and 14.60 per cent. in 1912; maintenance of equipment, 13.61 per cent. in 1913 and 14.01 per cent. in 1912; traffic and general expenses, 6 per cent. in 1913 and 6.05 per cent. in 1912. The total amount spent for transportation in 1913 was $8,899,000, an increase of $566,000, and the increase is about proportionate to the increase in business and earnings; but, as a matter of fact, since there were very considerable increases in a number of the wage schedules, there was a considerable gain in the effectiveness of the use of both the plant and, to possibly a less extent, of labor. The revenue train load in 1913 was 246 tons, as against 237 tons in 1912. Average loading per loaded car was very slightly better in 1913 than in 1912, being a little over 15 tons last year, and this better train loading was accomplished despite the fact that products of mines furnished but 24.60 per cent. of the total tonnage in 1913, as against 26.02 per cent. in 1912.




**The Seaboard Air Line.**

The train load on the Seaboard Air Line appears comparatively light, but for the character of service rendered it is not light. The Seaboard has an unusually interesting operating problem. The two main lines of the Seaboard are the lines running from Richmond, Va., to Tampa, Fla., and from Portsmouth, Va., to Birmingham, Ala. On the north and south line a very considerable portion of the tonnage handled is made up of fruit and vegetables. The freight service on this class of commodities as rendered by the Seaboard calls for a schedule of 72 hours from Tampa to New York; in other words, a remarkably fast service even for express matter. The service from Portsmouth to Birmingham is composed largely of merchandise brought from New York to Portsmouth by steamer and shipped over the Seaboard as far as Birmingham for distribution in territory southeast. This service has to compete with all-rail freight service and the Seaboard is making a very successful bid for this business. It takes about five days for a shipment via this route to go from New York to Kansas City. Business such as fruit and vegetables and this merchandise expedite traffic takes a high ton mile rate, but is very expensive to handle. Another example of the character of the Seaboard's business is the package freight from Jacksonville. Jacksonville is the chief distributing center for Florida and the Seaboard has a package freight service which delivers all package freight received in Jacksonville on one afternoon the following day to any point on the Seaboard lines in Florida.

The Seaboard is using Pacific type locomotives in its freight service. Out of the total 252 locomotives in freight service (owned at the end of 1913) 168 were 10-wheel and Pacific type locomotives, and since June 30 the Seaboard has added 35 Pacific type locomotives to its freight service.

It will be noted that the saving made in expenses in 1913 as compared with 1912 was in maintenance. Maintenance of way and structures cost $3,015,000 in 1913, a decrease of $332,000. Maintenance of equipment cost $3,239,000, an increase of $126,000. More than half of the decrease in maintenance of way expenses was in the single item bridges, trestles and culverts. In 1912 $502,000 was spent on this account, and in 1913 $346,000. The Seaboard has just completed a program of bridge renewals, and all bridges on main line are now Cooper E50, and while, of course, the additional cost of replacing an old structure with a modern one is charged to property account, the cost to replacement in kind is a charge to expenses, and this cost in 1912 and for two or three years previous was abnormally high. Maintenance of way, of course, does not vary in cost in proportion to changes in traffic and with a larger business carried maintenance of way charges would naturally show a smaller proportion of gross consumed by this account. The Seaboard Air Line was better maintained last year than it was the year before. The new management has had time to study carefully the needs of the property and the saving made, over and above the smaller sums spent for bridges, was the result rather of a cutting out of unnecessary expenditures than the reduction of any work that was necessary to the upkeep of the property.

It is almost universal now for railroad managements to make a definite appropriation by months or for longer periods for both maintenance of way and maintenance of equipment. Until recently, however, the practice of the Seaboard Air Line in this respect was rather indefinite and the maintenance force and motive power officers were not held very strictly to any definite appropriation. Last year, however, the Seaboard followed the practice now generally accepted as best of making maintenance expenditures conform strictly to a carefully thought out and generally adopted program. The maintenance of way expenditures in 1913 were at the rate of $981 per mile of road.

A detailed comparison of the Seaboard's maintenance charges with those of the Atlantic Coast Line and the Southern Railway per mile of road apparently indicates higher labor charges and lower costs for material. If the Seaboard was really stinting on its appropriations for ties and rails it would be a very poor sort of economy shown in the lower maintenance charges. As a matter of fact, however, the explanation seems to be that the Seaboard is getting its material more cheaply than is the Southern or the Atlantic Coast Line or else there is some difference in accounting methods as to what is charged to betterment and what to maintenance.

Repairs, renewals and depreciation per locomotive amounted to $2,557; per passenger car to $809, and per freight car to $60.

During the year the company spent a total of $3,659,000 for betterments and additional equipment. Of this amount $1,727,000 was spent for additions to the roadway and structures, and $1,932,000 for equipment. The largest expenditures for construction was $286,000 for storage warehouses, $218,000 for heavier rails, and $177,000 for station buildings and fixtures. It is interesting to note that the Seaboard now has 1,374 miles of telephone train despatch circuits in operation, 285 miles having been added last year.

The Seaboard Air Line operates 3,074 miles of road. The freight density in 1913 was 500,539, an increase over 1912 of 45,768. The passenger density was 77,247, an increase of 1,657. The average ton-mile rate in 1913 was 1.09 cents, and in 1912 1.11 cents. The revenue per freight train mile was $2.68 in 1913, and $2.63 in 1912. The average haul of freight was 148 miles, and the average passenger journey 42 miles. There was almost no change from 1912 to 1913 in these figures.

The Seaboard was in a very much stronger position as regards current assets at the end of the year than at the beginning. During the year $800,000 four per cent. refunding bonds were sold and $5,000,000 three year five per cent. notes, the total authorized issue of these notes is $6,000,000. On June 30, 1913, there was on hand $4,512,494 cash, no loans or bills payable, and total working liabilities of $2,893,000.

The following table shows the principal figures for operation in 1913, compared with 1912:

| | 1913. | 1912. |
|---|---|---|
| Average mileage operated | 3,074 | 3,059 |
| Freight revenue | $16,788,112 | $15,433,239 |
| Passenger revenue | 5,221,200 | 5,050,068 |
| Total operating revenue | 24,527,865 | 22,921,904 |
| Maint. of way and structures | 3,014,957 | 3,347,359 |
| Maint. of equipment | 3,338,542 | 3,212,278 |
| Traffic expenses | 765,763 | 715,361 |
| Transportation expenses | 8,899,267 | 8,333,358 |
| Total operating expenses | 16,725,613 | 16,280,087 |
| Taxes | 956,000 | 917,000 |
| Operating income | 6,819,938 | 5,702,131 |
| Gross income | 7,040,002 | 5,885,509 |
| Net income | 2,985,854 | 2,063,444 |
| Interest on income bonds | 1,250,000 | 1,249,658 |
| Surplus | 1,735,854 | 813,786 |

## MISSOURI, KANSAS & TEXAS.

EVEN making full allowance for the fact that in comparing 1913 with 1912 on the Missouri, Kansas & Texas the former year was a particularly unfavorable one, the showing made in the fiscal year ended June 30, 1913 is remarkably good. For a number of years the ratio of transportation expenses to total operating expenses has been in the neighborhood of 40 per cent. In 1913 the ratio was 37.90 per cent., comparing with 41.32 per cent. in 1912 and 39.25 per cent. in 1911. Both passenger and freight revenue increased very largely in 1913 over 1912 as a result of a 1.7 per cent. increase in the tons of freight carried, and an increase of 7.4 per cent. in the average length of haul of freight, and an increase of 5.6 per cent. in the revenue per ton per mile; and an increase of 9.6 per cent. in the number of passengers carried, and of 4.8 per cent. in the average passenger journey. The revenue per passenger per mile was slightly less in 1913 than in 1912. The increase in revenue per ton per mile was, of course, due to changes in the character of traffic carried.

In 1913 the Missouri, Kansas & Texas earned gross $32,346,000, an increase over 1912 of $4,160,000, or 15 per cent. Expenses increased but 8 per cent. With an increase in credit balance of hire of equipment just about offsetting increases in interest charges, the company had net available for dividends in 1913 $2,317,000, while in 1912 the company barely earned its interest charges. After the payment of 4 per cent. on the preferred stock, there was a surplus in 1913 of $1,796,000, which is equivalent to 2.84 per cent. on the outstanding common stock, which was, however, invested in the property.

The much lower ratio of transportation expenses to revenues in 1913 than in 1912 has already been commented on. The ratio of maintenance of way to revenue in 1913 was 14.33, as against 14.65 in 1912, and of maintenance of equipment 12.68, as against 13.29. The relative reduction in transportation expenses is due in the first place to better supervision, and in the second place to much improved operating conditions. There was a reduction of $146,000 in the cost to the company of injuries to persons, leaving, however, the very large amount of $659,000 paid out on this account even in 1913. The utterly unfair attitude which juries and public opinion in the Southwest take in regard to employees' suits for injuries has been commented on at length in these columns. The improvement shown in this account may be, and it is to be hoped that it is, in part the result of changing sentiment in regard to railroads, especially in Texas; but it is also in good part due to the efforts of the management to do everything in its power to reduce the possibility of such suits. As an example of these efforts, the company is spending considerable sums of money to equip freight cars with handholds, which are not only not liable to become loosened accidentally, but cannot readily be tampered with.

Since the greater part of the added freight revenue was due to a longer average haul, it was to be expected that a com-

parative saving could be made in many items of transportation expenses. This saving was helped by a slightly increased revenue train load and somewhat larger increased total train load, the revenue train load being 243 tons in 1913 and 241 tons in 1912, and the total train load being 287 tons in 1913 and 273 tons in 1912. The improvement in train loading was due almost entirely to a smaller percentage of empty car mileage. This percentage in 1913 was 35.58 per cent., and in 1912, 37.67 per cent. Car loading of revenue freight was not quite so good in 1913 as in 1912, the average per loaded car being 14.60 tons last year and 14.93 tons the year before, and the total number of cars per freight train remained almost exactly the same, namely, slightly less than 26.

There is an opportunity for a very materially larger average revenue train load on the M. K. & T. as a whole, and the lines in Texas have already shown a considerable improvement. During the latter part of the last fiscal year 40 mikado locomotives were added to freight service, and the use of these heavier engines in itself ought to increase the average train load. The M. K. & T. traffic is for most of the year an unbalanced traffic, and the company labors under a disadvantage as compared with the St. Louis & San Francisco in having no slow haul freight traffic northbound. In 1913 the Beaumont & Great Northern, which runs through the lumber district of east Texas and connects with the Trinity division (orphan line) of the Missouri, Kansas & Texas, was acquired, and in the near future some sort of a connection will be formed between this line and the main line of the Katy. This should supply the much needed northbound drag freight which will go far toward bringing up the average revenue train load.

Very extensive betterment work is in progress on the Missouri, Kansas & Texas; and by "extensive" is not meant some large spectacular line revision, but a general policy of bringing the whole property up to a higher standard. In 1913 a total of $2,455,000 was spent for additions and betterments to the property, exclusive of equipment, and of this amount $230,000 was for increased weight of rail, $402,000 for terminal yards, $204,000 for ballast, and $154,000 for station buildings and fixtures. Four hundred and fifty wooden trestles and culverts were renewed with concrete structures, and steel bridges were built on the Fort Worth, the Houston and the San Antonio divisions, and on the Texas Central, replacing pile trestles. All of the bridges north of the Red river on the main line have now been strengthened to permit of the operation of the mikado locomotives, and a program of bridge strengthening is being carried on on the lines in Texas.

The net expenditure for additional equipment for the year was $1,507,000.

During the year the company sold $19,000,000 2-year 5 per cent. notes, retiring $16,000,000 2-year 5 per cent. notes. The company also sold $1,900,000 5 per cent. equipment certificates. At the end of the year there was on hand $1,503,000 cash included in total working assets of $8,442,000, against which there were working liabilities of $7,362,000, which included $1,516,000 loans and bills payable, of which $800,000 were paid off to November 1, 1913.

The following table shows the principal figures for operation in 1913 and 1912:

| | 1913. | 1912. |
|---|---|---|
| Average mileage operated | 3,677 | 3,398 |
| Freight revenue | $20,912,978 | $18,100,906 |
| Passenger revenue | 9,402,967 | 8,220,409 |
| Total operating revenues | 32,346,258 | 28,186,719 |
| Maintenance of way and structures | 4,637,748 | 4,129,256 |
| Maintenance of equipment | 4,100,819 | 3,745,233 |
| Traffic expenses | 755,120 | 738,928 |
| Transportation expenses | 12,255,845 | 11,647,573 |
| General expenses | 1,058,880 | 944,859 |
| Total operating expenses | 22,808,412 | 21,205,849 |
| Taxes | 1,287,903 | 1,060,181 |
| Operating income | 8,249,943 | 5,920,689 |
| Gross income | 8,916,554 | 6,277,085 |
| Net income | 2,316,985 | 17,168 |
| Dividends | 521,052 | 521,635 |
| Surplus | 1,795,933 | *504,467 |

*Deficit.

## COLORADO & SOUTHERN.

THE Colorado & Southern operates 1,850 miles of road, all of which is single track with the exception of about three miles, and has 527 miles of yard tracks and sidings. The road performs two important services. It is an outlet for Colorado products to the gulf, forming part of a rail and water route to Atlantic seaboard markets, and a route for northbound winter fruit and vegetable shipments, and secondly, it taps the rich mining and bituminous coal fields of Colorado.

In 1913 the total tonnage of freight carried on the C. & S. was 7,453,000 tons, earning $10,836,000 revenue, and of the tonnage, 66.89 per cent. originated on the C. & S. lines and the remaining 33.11 per cent. on other roads. Bituminous coal furnished in 1913 29.39 per cent. of the total tonnage and 24.93 per cent. of the total revenue, and products of mines, including coal, furnished 62.66 per cent. of the tonnage and 44.16 per cent. of the revenue. Next in importance, both as to tonnage and revenue, is products of agriculture, which in 1913 furnished 16.04 per cent. of the tonnage and 20.81 per cent. of the revenue. Manufactures furnished 9.07 per cent. of the tonnage and 12.49 per cent. of the revenue. The principal change in the character of traffic in 1913 as compared with 1912 was a large increase in the tonnage and revenue from products of agriculture. This tonnage in 1912 was 944,000, and in 1913, 1,196,000; and the revenue in 1912 was $1,874,000, and in 1913, $2,255,000. There was a decrease in tonnage but a slight increase in revenue of products of mines, the tonnage of these commodities in 1912 being 4,772,000, and in 1913, 4,670,000, and the revenue in 1912, $4,747,000, and in 1913, $4,785,000.

The fiscal year ended June 30, 1913, was a profitable one for the C. & S. Its operating revenues amounted to $15,078,000, an increase of $1,118,000; and while expenses totaled $10,623,000, an increase of $1,007,000, the principal part of the increase came in maintenance expenditures, and transportation expenses amounted to $4,901,000 in 1913, as against $4,729,000 in 1912. The following table shows the percentage of operating revenues consumed by each of the five classes of expenses:

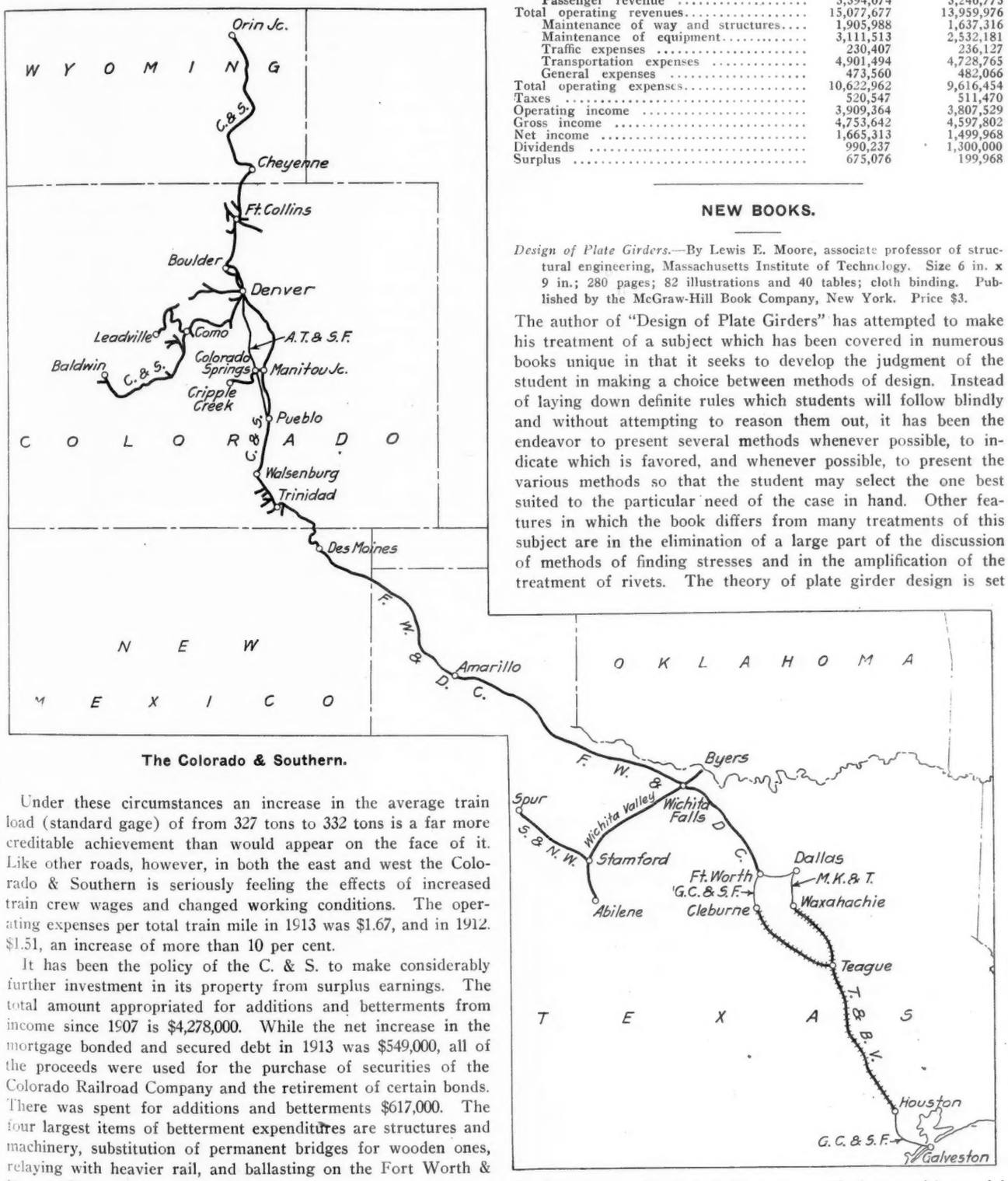
| | 1913. | 1912. |
|---|---|---|
| Maintenance of way and structures | 12.64 | 11.73 |
| Maintenance of equipment | 20.64 | 18.14 |
| Traffic expenses | 1.53 | 1.69 |
| Transportation expenses | 32.50 | 33.87 |
| General expenses | 3.14 | 3.45 |

After the payment of interest, rentals, etc., the company had available for dividends $1,665,000 in 1913 as against $1,500,000 in 1912.

Some of the reasons why it was possible to make such a considerably better showing in transportation expenses in 1913 than in 1912 are probably to be found in changes in operating conditions, of which changes it is evident that the management took full advantage. The number of passengers carried decreased by 263,000, the total in 1913 being 2,919,000; but the average passenger journey increased from 41 miles to 46 miles, the earnings per passenger per mile being 2.56 cents in 1913 and 2.52 cents in 1912. Thus, with a decrease in the number of passengers there was an increase in the number of passenger miles and a slight increase in the compensation per passenger per mile and the change in number of passengers and length of haul made it possible to decrease passenger locomotive mileage from 3,092,000 in 1912 to 2,817,000 in 1913. The tonnage of freight was 7,453,000 in 1913 and 7,148,000 in 1912. The average haul was 154 miles in 1913 and 148 miles in 1912, and the ton mileage rate, 9.44 mills in 1913 and 9.31 mills in 1912. Freight locomotive mileage increased by 180,000 miles, totaling 3,740,000 in 1913, and the total freight car mileage increased by 6,219,000, totaling 84,495,000 in 1913. But the greater part of this increase came in loaded mileage, which in 1913 totaled 55,373,000, an increase of over 5,000,000, while empty car mileage totaled 25,785,000 in 1913, which is an increase of less than 1,000,000 car miles.

It would appear from this and from a study of the changes

in the character of commodities carried that the Colorado & Southern is building up its through service both for freight and passengers, and is successful in getting a larger share of fruit and vegetable traffic from Colorado to gulf ports and eastern markets, and winter vegetable movement to Colorado, and that the short haul coal business, last year at least, fell off somewhat.




**The Colorado & Southern.**

Under these circumstances an increase in the average train load (standard gage) of from 327 tons to 332 tons is a far more creditable achievement than would appear on the face of it. Like other roads, however, in both the east and west the Colorado & Southern is seriously feeling the effects of increased train crew wages and changed working conditions. The operating expenses per total train mile in 1913 was $1.67, and in 1912. $1.51, an increase of more than 10 per cent.

It has been the policy of the C. & S. to make considerably further investment in its property from surplus earnings. The total amount appropriated for additions and betterments from income since 1907 is $4,278,000. While the net increase in the mortgage bonded and secured debt in 1913 was $549,000, all of the proceeds were used for the purchase of securities of the Colorado Railroad Company and the retirement of certain bonds. There was spent for additions and betterments $617,000. The four largest items of betterment expenditures are structures and machinery, substitution of permanent bridges for wooden ones, relaying with heavier rail, and ballasting on the Fort Worth & Denver City.

At the end of the year cash on hand amounted to $908,000, as against $747,000 at the beginning of the year, and total working liabilities amounted to $1,507,000 at the end of the year, as against $1,557,000 at the beginning of the year. During the year the Colorado & Southern cuts its dividend rate on the common from 2 per cent., calling for $620,000 dividends, to 1 per cent., calling for $310,000.

The following table shows the principal figures for operation in 1913 and 1912:

| | 1913. | 1912. |
|---|---|---|
| Average mileage operated | 1,850 | 1,881 |
| Freight revenue | $10,836,134 | $9,850,049 |
| Passenger revenue | 3,394,074 | 3,246,773 |
| Total operating revenues | 15,077,677 | 13,959,976 |
| Maintenance of way and structures | 1,905,988 | 1,637,316 |
| Maintenance of equipment | 3,111,513 | 2,532,181 |
| Traffic expenses | 230,407 | 236,127 |
| Transportation expenses | 4,901,494 | 4,728,765 |
| General expenses | 473,560 | 482,066 |
| Total operating expenses | 10,622,962 | 9,616,454 |
| Taxes | 520,547 | 511,470 |
| Operating income | 3,909,364 | 3,807,529 |
| Gross income | 4,753,642 | 4,597,802 |
| Net income | 1,665,313 | 1,499,968 |
| Dividends | 990,237 | 1,300,000 |
| Surplus | 675,076 | 199,968 |

## NEW BOOKS.

*Design of Plate Girders.*—By Lewis E. Moore, associate professor of structural engineering, Massachusetts Institute of Technology. Size 6 in. x 9 in.; 280 pages; 82 illustrations and 40 tables; cloth binding. Published by the McGraw-Hill Book Company, New York. Price $3.

The author of "Design of Plate Girders" has attempted to make his treatment of a subject which has been covered in numerous books unique in that it seeks to develop the judgment of the student in making a choice between methods of design. Instead of laying down definite rules which students will follow blindly and without attempting to reason them out, it has been the endeavor to present several methods whenever possible, to indicate which is favored, and whenever possible, to present the various methods so that the student may select the one best suited to the particular need of the case in hand. Other features in which the book differs from many treatments of this subject are in the elimination of a large part of the discussion of methods of finding stresses and in the amplification of the treatment of rivets. The theory of plate girder design is set forth and two detailed designs are worked out with careful discussion of each point as it arises. A chapter on box girders and one on shop practice are also included. The tables at the back of the book are intended to serve the purpose of the practicing engineer and it is the author's hope that they may prove of material assistance.

# Letters to the Editor.

## THE OVERLAP.

NEW YORK, November 6, 1913.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

At the recent Washington convention of state railroad commissioners, Mr. Sague, of the New York commission, speaking on the general subject of safety, and referring particularly to the question of automatic train stops as a preventive of rear collisions, took the position that the overlap was an adequate safeguard; perhaps the one necessary safeguard, and entirely adequate. I have not his exact words before me, but I believe I correctly represent the substance of his opinion; that the automatic stop problem is so difficult and costly that it is the duty of the railroads to find, without further delay, something less difficult and more feasible. In view of the fact that one prominent road—the Pennsylvania, west of Pittsburgh—already uses the overlap extensively, this official utterance of the New York authorities may prove to be filled with significance. What shall we do? Are there sound, or even plausible reasons for keeping all trains two blocks apart, as a minimum (which means three blocks in fast running)?

I believe it is a fact that many, possibly most, signal people have condemned overlaps and now oppose them. Aside from spacing of trains as affecting the capacity of the road, there are two stock arguments on the line of safety and moral effect.

1. With the overlap (particularly the whole block overlap as on the Pennsylvania lines west and with provision for a caution indication at each signal) an automatic signal at stop almost invariably gives false information to the engineman of a train approaching it; the first stop signal encountered is pretty sure to be at the entrance to a clear block. It is morally wrong to give an indication of block occupied or obstructed when the block is clear.

Of course the answer to this is that signals give commands (or indicate the absence of commands), not information. No stop signal necessarily means that the track is obstructed within a specified distance ahead; that there is "danger"; that it is *unsafe* for a train to proceed. If the officers of a road decide that it is advisable to have a train stop (and then proceed carefully) when conditions at some point not less than ¾ mile ahead are so-and-so, it is difficult to see that the engineman has any ground for quarrel with the arrangement or that there is ground for claiming that a deliberate attempt has been made to tell him something that is not true and thereby weaken his respect for signals and rules.

2. The engineman, knowing that there is almost certainly a clear block beyond the first stop automatic signal he comes to will not take such signals very seriously; will get into the habit of overrunning or disregarding them; and, finally, from force of habit, will overrun a second stop signal and strike a train just ahead. So that the road will be little or no safer with the overlap than without it.

The answer is that, on good railroads of today, this is not a serious contingency, because the old-fashioned observance of signals at discretion is being superseded by implicit obedience to signal-indications. The difficulty in these days comes from the overlooking or misreading of signals not (again referring to "good railroads") from practically deliberate disregard of signal indications because the visible conditions do not seem to justify the indications given.

Now, if the overlap is not subversive of sound operating principles, the question is simply, what remedy as good or better have we for the occasional wrecks which seem to occur because a single signal is misread or overlooked and which might, or, as to some at least, in all probability, would, have been prevented if a restricting signal indication had been given at a point farther back—that is, if there had been an overlap? As I see it, we Americans have stood up uncompromisingly for the practice of giving a stop indication at a signal located at the point, or possible point, of obstruction—at the fouling point of a junction, the length of a detector bar from a facing-point switch or a few feet from the insulating joints at the entrance to an automatic block—on the assumption that any train approaching, having received a caution indication in the rear (perhaps), will certainly stop before passing the signal. But experience discredits the practice. In spite of the supposed best discipline, careful selection and training of men and the efficiency tests, trains don't always stop. What is to be done about it? I believe our English friends have pretty consistently maintained overlaps in their manual signal operation—perhaps sometimes absolute, sometimes permissive ("section clear, station or junction blocked"). How much of their wonderful accident record is due to this practice added to almost unfailing observance of signals by the "drivers"? Incidentally they don't seem to be satisfied themselves with their wonderful record; perhaps it is falling off lately; an American factor may be creeping into the personal equation. For I hear that they are paying some attention to automatic train-control.

Of course, in any event, the overlap would not be a cure-all. But, by giving a man two chances to note restricting indications, before reaching an obstruction, it might eliminate some wrecks; and there might be some chance that, if a man were running regardless (dead or unconscious, or the like), the other man on the engine would see one of the signals and save the situation.

It is an interesting question whether about the same result would not be obtained by having the signal at the entrance to an occupied automatic block at stop and the first and second signals in the rear at caution, as by having the first signal in the rear at stop and the second at caution (the overlap arrangement that we have been talking about). If the main trouble is the overlooking or misreading of the first restricting (caution) indication, a second indication of the same kind might serve the purpose; although it is possible that the emphatic or arresting quality of the stop indication (or aspect) encountered by a man running along in serene unconsciousness of having passed a caution signal might have some advantage. Trains would ordinarily be spaced just as far apart under one scheme as the other, because, ordinarily, one train should follow another at such a distance as to get clear signals. But the "caution" overlap would save some (possibly) unnecessary stops and starts.

Then, again, perhaps a cab signal, possibly with an audible attachment, would serve to emphasize the one and only caution indication in the rear of a final stopping point and would, at the same time, maintain the caution indication in the cab where the engineman could refer to it and refresh his memory if he had slipped past a signal location without noting the indication. There are also stock arguments against cab signals, but we must remember that we may not always be able to run railway signaling on stock arguments.

Now, what is the result? A lot of talk and no conclusion. A good many people feel no doubt, that "we need something." But whether we should do nothing at all, aside from trying to improve the human element, until we some time come to an ideal train control that will force an engineman to taper off from full speed to a stop between a caution and a stop signal, or should at once introduce some less complete checks—overlaps, cab signals, gatling guns, or whatever—seems to be the question. Again, I say, what are we going to do about it? S. E. A.

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ORIGIN OF JAVA'S RAILWAYS.—Many of the steam tram lines in Java can hardly be distinguished from railways proper. Most of them had their origin as narrow-gage city tram lines carrying passengers only; but they have been extended from town to town, their gage widened, heavy rails laid, and freight and parcels service added. Up to the present time steam traction has been exclusively employed on these lines, but today most of them are planning to substitute electric traction for steam, the power in many cases to be obtained from hydroelectric plants.

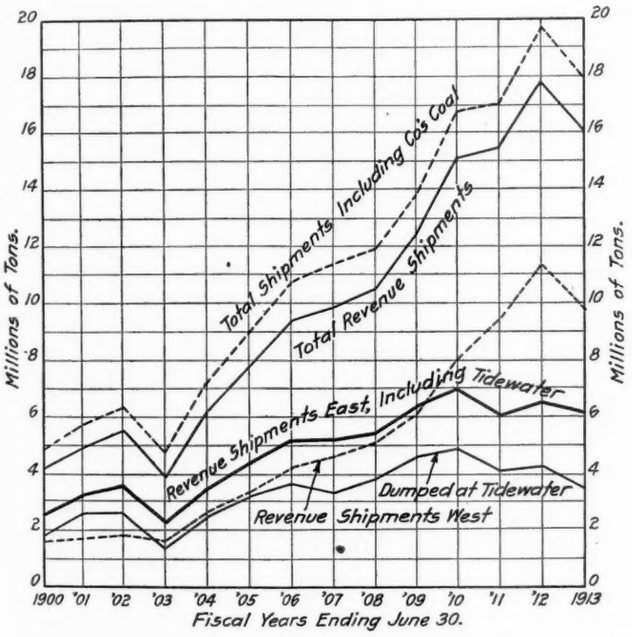
# STUDIES IN OPERATION—THE CHESAPEAKE & OHIO.

**An Increase of 187 Tons in Train Load in Two Years. What Is Being Done to Reap the Profit of This Gain in Efficiency.**

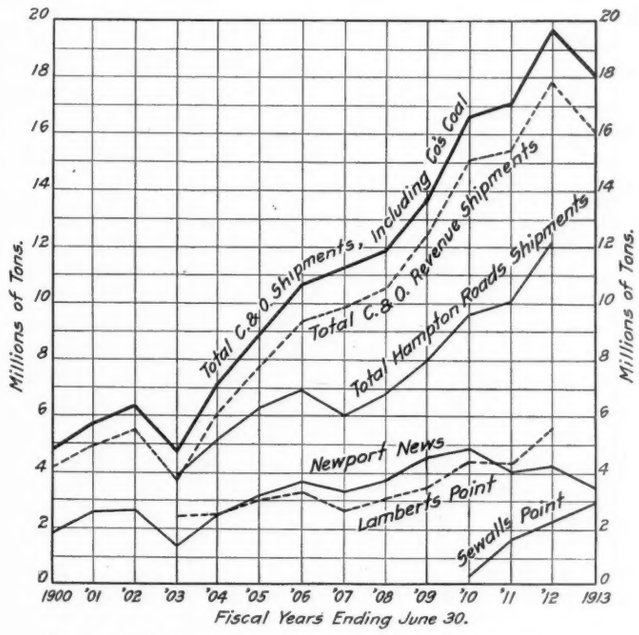
Many of the points about the Chesapeake & Ohio situation well illustrate the entire eastern railroad situation. Despite remarkable gains in train loading of freight and largely increased passenger business, the results of operation on the C. & O. since 1910 have shown a falling off in net. Of course, flood conditions served to reduce abnormally the net results of the last year. But more important than this incident are the general underlying causes that have brought this about. The Chesapeake & Ohio has today traffic pressing for carriage which it cannot handle, because in part of its inability to furnish cars, and because of the inability of its connections to accept coal shipments. The situation is the more impressive in that the property was built up with high standards and has never been stinted either as to maintenance or betterment, and the line itself is not now congested.

The Chesapeake & Ohio is an independent trunk line, running from Newport News, Va., to Chicago by way of the West Virginia coal fields and Cincinnati. The company has a 45 per cent. interest in the Kanawha & Michigan and controls through majority stock ownership the Hocking Valley. Until a few years ago the road was practically controlled by the Pennsylvania and the New York Central Railroads, ran only as far west as Cincinnati, had no connection of its own to the lakes, and the bulk of its freight business was coal, of which at that time 40 per cent. moved from the West Virginia fields to tidewater, and the other 60 per cent. from the coal fields west. Although the ton mile rate on this coal was low, the haul was comparatively long and the cost of handling low. The Norfolk & Western, also controlled by the Pennsylvania Railroad, was one of the Chesapeake & Ohio's important competitors on this business. The Baltimore & Ohio and the Pennsylvania were also keen competitors and notwithstanding the fact that the P. R. R. had a considerable stock interest in the C. & O., it did not prevent the latter from making a most effective fight for coal business and from keeping the interests of operators on its line well protected against operators on the Pennsylvania and B. & O.

With the sale by the Pennsylvania of C. & O. control to independent interests and the advent of a strong new competitor, the Virginian Railway, the situation became more complex. The Virginian competition has cut into the C. & O. tidewater coal business but has hurt the N. & W. very little. The reason for this is that the coal operators on the N. & W. are so closely tied up to that company, through the ownership of the coal lands by Norfolk & Western interests, that the Virginian could not get in. To get Norfolk & Western coal, therefore, vessels have to go to the N. & W. docks at Norfolk. The operators on the C. & O. on the other hand in some cases owned their own spur tracks and made connections with the Virginian, thus having the choice of two routes to tidewater. They could not, however, ship coal *west* over the Virginian. Westbound shipments therefore have to go over the C. & O. Since the Virginian can keep its coal cars on its own line, it can furnish operators 100 per cent. of their car requirements for tidewater. Naturally the shippers turned to the Virginian as large a share as possible of their tidewater coal and used C. & O. cars for westbound shipments. Furthermore, the Virginian dock at Norfolk permitted very much quicker loading of vessels than did the C. & O. dock. Vessels therefore preferred to go there for loading. The latter company is now taking steps to meet this situation by the erection of a moderen coal dock that will be completed by April 1, 1914.




**C. & O. Coal Shipments 1900 to 1913.**




**C. & O. Shipments and Other Tidewater Shipments.**

Coal shipments from West Virginia have increased enormously in the past few years, but since both the Virginian and the Norfolk & Western were in a better position to get the lion's share of the tidewater business, the Chesapeake & Ohio's increase in coal traffic has been mostly in the traffic westbound To prepare for and to develop this business the bankrupt Chicago, Cincinnati & Louisville (the short line from Cincinnati to Chicago) and the Hocking Valley were bought in 1910, giving the C. & O. an outlet to the lakes and to the northwest; but while the Hocking Valley has already shown its value as an investment, the Chicago line is only now beginning to earn the interest charges on its cost.

There were serious difficulties in the way of the development of

business over both the Hocking Valley and the Chicago line. The three coal fields tributary to the Chesapeake & Ohio are the New River, east of Gauley, the Kanawha, between Gauley and Huntington, and the Kentucky fields, reached by the Big Sandy branch from Ashland. On coal from the New River fields for the Hocking Valley the C. & O. gets only a very short haul, and a division of the rate which allows it about 30 cents a ton. The coal is turned over to the Kanawha & Michigan at Gauley. Kanawha coal, if it were to be delivered to the Kanawha & Michigan, would have to be back-hauled and would yield the C. & O. but a meager division of the rate, beside being expensive to handle. Kentucky coal could not naturally be routed back over the C. & O. to Gauley or Charleston for destinations on the H. V. The C. & O. Kanawha and Kentucky coal for shipment to Toledo is routed via the C. H. & D. at Cincinnati, except when the latter gateway is congested as at present, in which event a portion is sent via Kenova, and N. & W. for delivery to the Hocking at Columbus.

The Chicago line, when the C. & O. bought it, was in poor physical shape. It was laid with the 70-lb. rail, with little or no ballast on the greater part of the line, and light bridges and trestles. It could handle but a small part of the business which the C. & O. might have delivered to it. The Chicago line exit from Cincinnati is over a short but very steep grade.

Here, then, was the situation in 1910 when the C. & O. itself was being worked to about the full limit of its economical capacity.

The Chicago line had to be improved; certain double track work on the C. & O. already begun had to be completed; it was of the utmost importance that a new dock be built at Newport News; new equipment was needed; and a C. & O. connection direct with the Hocking is an eventual necessity.

During the past few years the Chesapeake & Ohio has spent $12,543,000 for second track and additions and betterments, excluding expenditures on the Chicago line; $1,537,000 for extensions of branch lines, and $12,805,000 for cars and locomotives. It must be remembered that the great growth in traffic on the C. & O. in the past four years has been in coal westbound. Of the expenditures for additions and betterments, however, some part were made on the eastern end of the line, on work which had already been begun, and the double tracking of the Cincinnati division was the most important and extensive piece of work done to lessen the cost of westbound movement.

The total mileage operated by the Chesapeake & Ohio in June, 1913, was 2,338 miles, of which 575 miles had second track; and the system had 971 miles of sidings. On double track, side tracks are from nine to 15 miles apart, and the freight trains are often compelled to back over on to the opposite main track to permit passenger trains to pass. The road is operated in seven divisions with road mileage as follows: Richmond, 455; Clifton Forge, 256; Hinton, 441; Huntington, 360; Cincinnati, 162; Ashland, 382; C. & O. of Indiana, 284. The Richmond division is divided into four districts; the Clifton Forge division into two; the Hinton division into three; the Huntington division into three; the Cincinnati division is not divided; the Ashland division into three, and the C. & O. of Indiana into two.

The following table shows certain important characteristics of traffic in 1911, 1912 and 1913:

| | 1913. | 1912. | 1911. |
|---|---|---|---|
| Revenue coal carried | 16,047,704 | 17,845,159 | 15,782,002 |
| Tonnage of manufactures | 1,934,216 | 1,867,518 | 1,986,572 |
| Total revenue tonnage carried | 25,174,241 | 26,147,903 | 24,604,650 |
| Total revenue ton mileage | 6,694,879,287 | 6,692,114,437 | 6,082,682,596 |
| Revenue per ton per mile on coal (mills) | 3.15 | 3.17 | 3.22 |
| Revenue per ton per mile on freight other than coal (mills) | 6.05 | 6.39 | 6.45 |
| Average haul of all revenue freight | 266 | 256 | 247 |
| Number of passengers carried | 5,859,447 | 5,489,040 | 5,618,791 |
| Passenger mileage | 267,044,325 | 252,397,519 | 253,262,253 |
| Revenue per passenger per mile | (cents) 2.194 | (cents) 2.181 | (cents) 2.177 |

An idea of the relative business on these divisions may be had from the following table showing the revenue tons moved per mile of road in August, 1913, on each of the divisions:

| | | | |
|---|---|---|---|
| Richmond | 242,000 | Cincinnati | 889,618 |
| Clifton Forge | 301,666 | Ashland | 123,216 |
| Hinton | 242,004 | C. & O. of Indiana | 154,378 |
| Huntington | 296,171 | | |

The most economical development of a railroad property consists, of course, in making each expenditure for additions or betterments fit into a general scheme for making the plant more efficient or for gaining additional business; and economies of operation are more quickly realized when the physical improvement of the plant goes hand in hand with and keeps at least abreast of the increase in traffic and the more efficient use of the plant. It has often been demonstrated that an increase in train load unaccompanied by the necessary higher standards of equipment and increased facilities for handling long trains, may result in higher instead of lower transportation expenses. Handling coal traffic on the Chesapeake & Ohio does not consist simply in loading the cars to their fullest capacity at the mines, moving them in solid train loads—each locomotive having its highest possible rating—uninterruptedly to tidewater and there dumping the coal into the holds of vessels. If it did the C. & O. ratio of transportation expenses to total operating revenues might compare with the Carolina, Clinchfield & Ohio, where the transportation ratio is less than 18 per cent. As a matter of fact, the transportation ratio in 1913 on the C. & O. was 32.5 per cent.; in 1912, 30.6 per cent., and in 1911, 30.9 per cent. The fact that the road has a large passenger business and a large freight business in merchandise and manufactures would preclude the possibility of obtaining any such transportation ratio as that on the C. C. & O. However, while the average revenue train load has increased from 656 tons in 1911 to 843 in 1913, the ratio of transportation expenses to total operating revenues has increased from 30.9 per cent. in 1911 to 32.5 per cent. in 1913, and this is due in large part to increase in wages, lower receipts per ton (not per ton mile, as will be explained more fully later), and to the unnatural conditions brought about by the floods. Still further economies may also result from adding more passing tracks, or possibly from the use of one track for drag freight only and working the other track as a single track for passenger trains, local freights and empties.

Large sums expended in repairing flood damages would no doubt have been put into additions and betterments but for this disaster. But in any case, a management cannot go to its board of directors and say, "We intend to increase the train load—you must take our word for that; but before we do so we wish you to provide additional facilities which will be needed when we do increase the train load." The management has first got to actually demonstrate the fact that it can increase the train load and then ask for further facilities. More especially is this true on a road which like the Chesapeake & Ohio, which has not had a long record of substantial dividend payments on its stock, and which has high fixed charges.

In 1911 the average revenue train load was 656 tons; in 1912, 756 tons, and in 1913, 843 tons. The increased train load is therefore now an accomplished fact and from an operating man's point of view the methods used to effect the increase are of themselves interesting.

### HOW THE INCREASED TRAIN LOAD WAS OBTAINED.

As the company has, during the past three years, bought a good many new and powerful locomotives, the addition to the motive power would naturally be looked to for an explanation of the greater train load; but a little study of the division records shows some large increases on divisions where there were no new engines; and the true explanation of the 186 ton improvement is found to have been largely in the commonplace details of every day work. An officer of the road estimates that a considerable part of this improvement is in this feature.

| Division. | Net tons per train mile. Fiscal year 1913-12. | Per cent. of increase | Fiscal year 1912-11. | Per cent. of increase | Fiscal year 1911-10. | Locomotives per train mile. Fiscal year 1913-12. | Fiscal year 1912-11. | Per cent. of increase |
|---|---|---|---|---|---|---|---|---|
| Richmond ..... | 854 | 2.9 | 830 | 5.4 | 774 | 103 | 102 | 1.03 |
| Clifton Forge... | 924 | 18.0 | 868 | 8.1 | 780 | 116 | 112 | 1.12 |
| Hinton ..... | 957 | 12.2 | 853 | 37.9 | 572 | 122 | 129 | 1.15 |
| Huntington .... | 975 | 4.0 | 934 | 19.5 | 733 | 111 | 118 | 1.11 |
| Greenbrier ..... | 410 | 3.4 | 396 | 14.1 | 341 | 106 | 105 | 1.05 |
| Cincinnati .....1.550 | | 62.0 | 957 | 5.8 | 892 | 103 | 107 | 1.07 |
| Ashland ..... | 463 | 20.9 | 383 | 7.7 | 338 | 115 | 114 | 1.21 |
| C. & O. of Ind. | 576 | 34.9 | 427 | 23.3 | 326 | 135 | 133 | 1.12 |
| Total ..... | 901 | 14.3 | 788 | 15.2 | 656 | 114 | 115 | 1.11 |

AVERAGE NUMBER OF LOCOMOTIVES IN FREIGHT SERVICE.

| Division. | Fiscal year to June 30, 1913. 10-wheel. | Consol. | Mallet. | Mikado. | Fiscal year to June 30, 1912. 10-wheel. | Consol. | Mallet. | Mikado. | Fiscal year to June 30, 1911. 10-wheel. | Consol. | Mallet. | Mikado. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Richmond ... | 2.3 | 42.0 | 0.4 | 2.0 | 2.9 | 44.1 | .. | 1.0 | 2.9 | 47.2 | .. | .. |
| Clifton Forge | 2.0 | 38.3 | .. | .. | 1.6 | 37.2 | .. | .. | 1.8 | 38.1 | .. | .. |
| Hinton ..... | .. | 31.1 | 31.0 | 1.8 | 0.2 | 44.7 | 20.5 | .. | .. | 53.3 | 6.8 | .. |
| Huntington.. | 1.5 | 38.3 | 1.3 | 13.3 | 2.5 | 55.8 | .. | .. | 3.8 | 47.7 | .. | .. |
| Greenbrier... | .. | 5.3 | .. | .. | .. | 6.2 | .. | .. | 4.8 | 2.5 | .. | .. |
| Cincinnati... | 1.8 | 7.0 | .. | 17.4 | 6.1 | 32.5 | .. | 0.4 | 3.7 | 37.4 | .. | .. |
| Ashland..... | 3.2 | 37.8 | .. | .. | 1.1 | 32.9 | .. | .. | 1.4 | 32.9 | .. | .. |
| C. & O. of Ind. | 0.6 | 36.7 | .. | .. | 2.3 | 32.8 | .. | .. | 0.7 | 20.2 | .. | .. |
| Total ...11.4 | | 236.5 | 32.7 | 34.5 | 16.7 | 286.2 | 20.5 | 1.4 | 19.1 | 279.3 | 6.8 | .. |

The locomotive runners now get more work out of their engines, the yardmasters are more careful to load engines to their full capacity, and the cars, especially coal, are more uniformly loaded with all that they can safely carry.

This extensive improvement was begun with the measurement of the work of all the engines in through freight service by a dynamometer. The dynamometer car of the Westinghouse Air Brake Company was secured in January, 1912, and for six months it was kept in constant service, being taken to all of the divisions of the road. It was used 8 weeks on the Huntington division; 8 weeks on the Hinton division; 2 weeks on the Clifton Forge division; 2 weeks on the Richmond division and 4 weeks on the Cincinnati division.

The management of this car was in the hands of Isaac Simpson, of the Westinghouse Company, and W. F. Walsh, air brake inspector of the Chesapeake & Ohio; and while, of course, the officers of the road, from the head down to road foremen of engines and the trainmasters, were constantly engaged in the campaign, these two men held the "center of the stage" in the work of improvement. Every engineman came in contact with them, and not only saw the records made by the instruments, but got a share of the enthusiasm which animated the man who made the tests. Science, as embodied in the car and its operations, and the skill which has its foundation in the long experience of the enginemen were combined, with a view to producing the best possible results; and evidently a marked success was accomplished. Practically all of the enginemen were runners of experience, thoroughly acquainted with their engines and with the road.

The 450 enginemen in through freight service were assigned to the principal divisions as follows: Richmond, 47; Clifton Forge, 101; Hinton, 138; Huntington, 65, and Cincinnati, 45.

The value of a dynamometer record as an index to the efficiency of a locomotive is recognized, of course, by everyone; but in a campaign to impress this idea on a large number of enginemen, and to do it without unnecessary loss of time, simplicity and directness are two essential elements in the process; and in this case the lessons were made both simple and direct by the use of a large indicator fixed on the side-wall of the car so as to be readable by a person standing anywhere in the car. On this indicator, the dial of which is about 18 in. in diameter, the pointer, moving with the fluctuations in the pull on the drawbar, measured the work being done by the engine, mile by mile, so vividly as to impress the most careless or incredulous. In making the tests enginemen were temporarily relieved by the road foreman so that they could go back into the car. After watching the dial for a while, any engineman who was disposed to make "claims" concerning the virtues or superiority of his past practice was very quickly convinced that only the cold facts could be of any avail. Watching the behavior of the engine and the readings of the indicator simultaneously, the accuracy of the machine was so evident that he had no word of criticism or complaint.

The recording apparatus not only indicated draw-bar pull and speed, but was made to show, by means of pens controlled through electric push-button circuits, by an observer riding on the locomotive (1) throttle lever opening; (2) reverse lever position; (3) boiler pressure, and (4) shovelfuls of coal supplied to the fire. Thus an engineman reading the record soon felt fully "at home," and if he entertained any jealousy of new-fangled tests, that feeling was quickly dissipated. As when one has his portrait taken, and first looks at the photographer's proof, the enginemen had to admit the primary fact that, whether favorable or unfavorable, the showing was a faithful and accurate reproduction.

With all of the runners fully impressed with (1) a fresh and detailed, and perhaps a revised, estimate of their own abilities; (2) with the fact that such an illuminating record could be made at any time, and (3) that alert officers, determined to make the best possible showing for the division, were studying these records and would compare one engineman with another, there was no difficulty in securing at once a very satisfactory spirit of emulation. Moreover, the enginemen did not have to learn anything radically new. No novel tricks were introduced. Each one had a new motive to do his very best at all times, and, with few exceptions, each already knew pretty well what his very best was, or ought to be; only he had not known it thoroughly enough to impel him at all times to work his mental machine to its highest efficiency.

In so far as working engines to their capacity increases engine failures, or breakages of drawbars, or abnormal delays in switching at way stations or in movements at meeting points, there is a loss; but this element has not been serious.

The tractive effort of the different classes of engines is as follows: Consolidation (279 engines in service January 1, 1913) 41,140 lbs.; Mikado (50 in service) 60,800 lbs.; Mallet (52 in service) 82,000 lbs. working compound and 98,500 lbs. working simple.

TYPICAL DAILY REPORT OF TRAIN TONNAGE—SLOW FREIGHT TRAINS.

| District. | No. trains today. | Average tonnage today. | Total No. trains to date this month. | Average tonnage to date this month. | Average tonnage to corresponding date last month. | Per cent. of tonnage rating handled this date | Per cent. of tonnage rating handled to date this month. |
|---|---|---|---|---|---|---|---|
| Peninsula .....E | 3 | 4152 | 56 | 4155 | 4175 | 100 | 100 |
| Peninsula .....W | 2 | 1900 | 69 | 1807 | 1942 | 85 | 81 |
| Rivanna .....E | 5 | 4489 | 100 | 4494 | 4544 | 100 | 100 |
| Rivanna .....W | 5 | 1435 | 117 | 1432 | 1438 | 69 | 69 |
| Piedmont .....W | 1 | 1000 | 31 | 1080 | 1018 | 80 | 82 |
| Washington .....E | 2 | 1100 | 44 | 1100 | 1100 | 100 | 100 |
| Mountain .....E | 1 | 750 | 17 | 810 | 1073 | 28 | 68 |
| James River.....E | 4 | 4485 | 97 | 4431 | 4427 | 100 | 100 |
| James River .....W | 5 | 1542 | 132 | 1464 | 1479 | 100 | 99 |
| Alleghany .....E | 7 | 4491 | 148 | 4404 | 4346 | 100 | 99 |
| New River .....E | 10 | 3599 | 206 | 3413 | 3334 | 100 | 98 |
| Greenbrier .....W | .. | .... | 6 | 2644 | 2696 | ... | 88 |
| Kanawha .....W | 3 | 3948 | 97 | 3978 | 3624 | 100 | 99 |
| Guyandotte .....W | 7 | 3659 | 127 | 3526 | 3419 | 96 | 100 |
| Lexington .....W | 2 | 975 | 49 | 1057 | 1047 | 100 | 99 |
| Louisville .....W | 1 | 1173 | 1 | 1173 | 141 | 98 | 98 |
| Big Sandy .....W | 3 | 3189 | 82 | 3125 | 3177 | 106 | 103 |
| Cincinnati .....W | 8 | 5400 | 157 | 5217 | 5017 | 100 | 100 |
| Miami .....W | 1 | 2100 | 25 | 2098 | 2052 | 100 | 100 |
| Wabash .....W | 1 | 2383 | 35 | 2383 | 2338 | 99 | 100 |
| Between Summit & Boston .....W | 4 | 2135 | 75 | 1921 | 1896 | 100 | 100 |

The improvement in efficiency due to the increased number of large locomotives may be understood by the statement of engines in service in different districts.

The most marked improvement in a divisional record with no

change in the character of the locomotive was that on the Richmond division, the average train load for the year ending June 30, 1912, being 830 tons, as compared with 789 for the year previous, a gain of 5.2 per cent.

The greatest increase on a single division was that of 38 per cent. on the Hinton division (572 to 789). Here, besides an increase from 223,000 to 693,000 miles made by Mallet engines of 82,000 lbs. tractive effort (98,500 lbs. simple) trains were double-headed more in 1912 than in 1911, the average number of engines per train mile rising from 1.15 to 1.29.

On the Cincinnati division for year ending June 30, 1913, the average train load was 1,550 tons, as against 944 in 1911, an increase of 606, over 39 per cent.; and there was a decrease in doubleheading.

On the Chesapeake & Ohio of Indiana, for the year ending June 30, 1913, was 578 tons as against 427 tons last year, an increase of 60 per cent.

The inclusion of the figures of the C. & O. of Indiana materially lowers the average train load over the entire system, and conversely, of course, the improvement on the Chicago line is bringing up the general average. This is an important factor to bear in mind when considering the possibilities of further improvement.

Even in the present months of heavy freight movement the Chesapeake & Ohio is not badly short of locomotives. The use of Mallet engines is being extended and with the increase in the average size of locomotives the freight train load will undoubtedly be further increased; but the all important point is that the keying up of the organization to a larger train load has been actually accomplished.

The only object in getting a greater average train load is to reduce transportation expenses per unit of traffic handled, or if not to actually reduce, at least to offset increases in these unit costs due to other causes.

Total transportation expenses in 1911 amounted to $9,192,005; in 1912 to $10,503,415, and in 1913 to $11,380,998. The Chesapeake & Ohio for its own use makes a particularly good, common sense division of transportation expenses as between supervision; despatching, telegraph and signals; station expenses; yard expenses; passenger-train expenses; freight-train expenses; claims and damages; miscellaneous expenses, and joint operating expenses. The great saving that should be made by increased freight train loading would come, of course, in freight train expenses. These expenses in 1911 amounted to $3,565,968; in 1912 to $3,947,021, and in 1913 to $4,117,199. The cost of freight train expenses per 100 revenue miles in 1911 was 6.10 cents; in 1912, 5.90 cents, and in 1913, 6.15 cents. Increases in wages made the 1913 about $1,500,000 higher than they would have been with the same force if 1910 wage scales had been in effect. In other words, insofar as freight train expenses are concerned, the increases made in train loading have a little more than offset the great increases in expenses due to higher wages paid to train crews, somewhat higher fuel costs and the very materially high costs due to the flood in 1913 and its after effects. The total freight train expenses per train mile in 1911 were 41.83 cents; in 1912, 44.81 cents, and in 1913, 51.87 cents. Passenger train expenses per passenger train mile were 27.48 cents in 1911, 27.25 cents in 1912 and 29.56 cents in 1913. Thus train expenses per passenger train mile have increased between 7 and 8 per cent., while train expenses per freight train mile has increased nearly 24 per cent. With larger locomotives and heavier freight trains expenses per mile would naturally increase and, of course, the ton mile cost is the time measure of economy of operation.

Increase in trainmen's wages would affect passenger train expenses in about the same proportion as freight train expenses; but the flood and its after effects would affect freight train expenses to a far greater degree than passenger train expenses. This for two principal reasons. While the C. & O. itself was still feeling the effects of the flood and train service was delayed on that account, passenger service was, of course, give the preference and freight movement suffered in a dozen different ways; the devil of overtime takes the hind most. This cause, was operative only while the C. & O. was itself recovering from flood damage which was only for about one month. Some of the lines to which the C. & O. delivers its freight have not even yet recovered from the damage due to the flood, and the inability of connecting carriers to accept freight is the other important cause of the increase in transportation expenses in freight service on the Chesapeake & Ohio. Yard expenses reflect the very great increases in wages of yard employees' wages. In 1911 the total was $1,902,501; in 1912, $2,120,737, and in 1913, $2,361,995. This is a total increase of 24 per cent., with, it will be remembered, an increase of 10 per cent. in ton mileage handled. Overtime in 1912 cost 2.08 cents per train mile, which was slightly lower than the cost in 1911, but in 1913 it amounted to 4.11 cents, showing in some small part the effect of the delay caused by washouts, etc., and the delay due to congestion at Cincinnati because of the inability of connecting carriers to accept shipments, but even more the effect of a change in working conditions. Actual time spent on the road is not now much greater—if any greater—than in 1911.

### CONCLUSIONS.

This, then, is the Chesapeake & Ohio situation. Serving a territory which furnishes a large passenger business, the road has largely increased its passenger service in the last few years, and with this increase in passenger business has gone a very large increase in merchandise business and a tremendous increase in the movement of coal west from the west Virginia coal fields. Heavier locomotives have been added and the freight train load has been increased remarkably. But despite this fact, and despite the fact that there is no congestion on the Chesapeake & Ohio itself, expenses have increased out of proportion to the increase in gross earnings. The C. & O. could obtain at present 20 per cent. more coal shipments a day if it could supply the cars for loading and get loaded cars accepted by its connections. The C. & O. owns plenty of cars but when they are loaded it can not get its connections to take them and it cannot get empties back after loaded cars have gone to connections. The most profitable part of the C. & O. business is its coal business, and the coal business to tidewater is more profitable than the business, as now handled, from the Kanawha and Kentucky fields to the west. Not only must the Chesapeake & Ohio equip itself to handle a larger business, but it is under the necessity also of earning a fair return on the property investment with very low ton mile rates.

To make the operation of the property such as to save for net a fair proportion of the gains which should result from the already very large average train load, some new side tracks should be built and a number of existing tracks lengthened; and there should also be certain additions to terminal and shop facilities. A rough estimate of the cost of such additions and betterments would be $1,500,000. To become in part independent of the difficulties due to the inability of connecting carriers to receive freight, the Chicago line should be further strengthened so as to permit of the use of Mallet locomotives and correspondingly heavy train loads, with certain changes of grade and alinement, costing, we will say, in the neighborhood of $2,000,000, but this is considered a requirement of the future rather than a present necessity.

Since the Chesapeake & Ohio cannot afford to simply perform a switching service for coal going to the lakes, it must do something to get a larger division of the through rate on lake coal. The obvious method of doing this would be to build a connection from some point west of Russell-

yard to the Hocking Valley. Such a connection might possibly be built for about $6,000,000.

The company must also from year to year add new equipment and replace light cars with modern large capacity cars. The company is now spending about $1,500,000 for a new dock at Newport News which when completed will give it facilities not only for loading vessels as rapidly as the Virginian dock but will permit of loading vessels at both sides of the dock at the same time. In other words, there will be two complete plants, elevators and all. The Virginian dock loads on either side but is a single plant. The C. & O. is about to receive 2,000 70-ton gondola cars, which can be used *only* for tidewater business with the new dock facilities, and with these 70-ton cars, coal operators will have the necessary incentive to ship their tidewater coal over the Chesapeake & Ohio, which will enable the latter to recover a greater portion of its lost tidewater business. With a connection with the Hocking, the C. & O. can amply take care of its operators with markets at Toledo and the northwest and relieve the congestion at Cincinnati. These improvements will necessitate further investment in the property. To induce further investment railroad credit must be strengthened.

Not the most ardent of shippers or the most altruistic theorist can claim that 5 per cent. increase above 3.15 mills per ton per mile would make more than a reasonable rate for the transportation of coal; but the importance of the moral effect on railroad credit, of allowing an increase would, right here in the Chesapeake & Ohio case, be so very much greater than the direct increase in net earnings that for the purpose of the study of the needs of the property and of its problems, the direct increase in net might well be entirely neglected. The importance to coal operators of West Virginia in the development of their property, of adequate railroad facilities, is almost incalculable. It may well be that the Chesapeake & Ohio can increase its business other than coal, continue to some extent to increase its efficiency in the use of its present facilities, and so continue to earn a moderate profit; but can the shippers in C. & O. territory possibly afford to forego the opportunity which they have of developing their business through an increase in the facilities of this railroad? That is the responsibility that the Interstate Commerce Commission must face in the present rate hearing.

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THE GAGE OF CHINESE RAILWAYS.—The railways of China have been constructed very largely without regard to a national system. Each road is more or less local, not only in its interests and support, but in its physical characteristics. Where interests other than Chinese have impressed themselves upon the railways, they have insisted upon following their own ideas and plans, their own gage, their own rails and materials, and their own railway methods. The result is that from a physical standpoint China has not what in any sense may be called a homogeneous and national railway system. The welding of the many lines now constructed or being constructed into one homogeneous system, or even into several homogeneous systems, will be exceedingly difficult because of differences in gage. As a rule, China has adopted the 4 ft. 8½ in. gage, but several important lines are of a different gage. For example, the new line in Yunnan has used the meter gage, and the Kwangsi authorities appear to have determined to break away from what is supposed to be the standard, and have either the meter or a narrower gage. What the conversion of these lines to a standard Chinese gage will cost may be appreciated from the expenditures Japan is finding necessary in widening the gage of its Tokyo-Shimonoseki line. This will mean business in the future, but prevents business on a standardized scale for the present. Some of the more recently constructed roads are in fine physical condition. In fact most of them have been constructed upon too costly a scale for the traffic they are likely to get for a great many years to come.

## THE RAILWAY EMPLOYEE AND THE RAILWAY PATRON.*

BY SAMUEL O. DUNN.

There are three classes of persons who are interested in railway management and operation and their results. These are, the owners and managers of the railways, the employees of the railways, and railway patrons. In the class of railway patrons belongs practically the entire public. It is to the interest of all of these classes that each of them shall be fairly dealt with; but it is especially to the interest of each two of them that the other shall not get an unfair advantage over them.

The relations between the railway managers and owners, on the one side, and railway patrons, on the other, have been thoroughly ventilated and extensively dealt with in recent years. A system of public regulation has been developed which has greatly improved these relations, and which seems adapted to remedy any serious defects which still exist in them or which may develop. Meantime, important changes have been taking place in the relations between railway employees, on the one hand, and the railways and railway patrons, on the other.

The patrons of the railways—using that term in its broadest sense—are interested in railway management and operation chiefly from two points of view. They desire the railways to be economically operated, for on the cost of producing transportation depend the rates for which it may be sold. The reasons why they are concerned as to the safety of transportation are equally obvious. Now, it is well known that until within the last decade railway rates in this country rapidly declined. It is also well known that during the last decade this decline has ceased, and that now the railways are petitioning for advances in rates on the ground that they must have larger net earnings in order to remain solvent and make needed improvements and extensions. Different persons offer different explanations for the trouble in which the railways find themselves. Some assert that their net earnings have enormously increased, but that they have "watered" their capitalization, and that it is for the purpose of paying a return on their watered securities that they need more net revenue. Others concede that their trouble is due to increases in operating expenses, but assert that these increases have taken place chiefly in the expenses incurred in the purchase of supplies and equipment, and are largely due to questionable relations between railways and their directors and officers, and railway supply concerns. Finally, railway officers contend that the trouble of the railways is due chiefly to enormous increases in the wages paid to labor unaccompanied by increases in the efficiency of labor, but rather accompanied by decreases in its efficiency.

The last decade has been a period of great industrial and commercial expansion. It has also been a period of substantial growth of railway mileage and traffic. In such a period we should expect to find that there had been a large increase in railway gross earnings. It is well known that during this decade the railways expended large sums in the improvement of their roadway, the reduction of grades, the elimination of curves and the acquisition of more powerful locomotives and larger cars. One of the main purposes of these expenditures, involving the investment of large sums of new capital on which a return must be paid, has been to reduce the cost of operation, and especially the cost of labor, and thereby increase the net earnings available for improvements and return on capital. We should, therefore, expect to find that during this period there was a very large increase in net earnings. Meantime, there were substantial advances in the prices of commodities, and in house rentals, etc., which raised the cost of living. Therefore, we should also expect to find that there had been large advances in the rates of wages paid to employees.

*Abstract of an address before the Traffic Club of Chicago, November 25, 1913.

But while we should expect to find that there had occurred increases in the rates of wages paid, we might also expect to find that the tendency toward an increase in the total cost of labor due to this would be very largely counteracted by the effect of the expensive improvements which have been made for the express purpose of making savings in labor and labor costs.

In consequence, we might expect to find that the total increase in the cost of railway labor had been at least no greater in proportion than the increases in gross earnings, in other operating expenses and in net earnings.

Now, what are the facts? The total earnings have largely increased. What has been and is being done with the money? I have made a table based on the statistics of the Interstate Commerce Commission for the years 1901 and 1911, which shows the absolute increases, and the percentages of increase, during this ten years in the ton-miles of freight traffic, in the passenger-miles of passenger traffic, in the gross earnings, in the operating expenses, in the net earnings, in the operating expenses other than the wages of labor, and in the wages of labor, on the railways of the United States. This table is as follows:

| | 1901. | 1911. | Increase. | Inc. P. C. |
|---|---|---|---|---|
| Tons carried one mile. | 147,077,136,040 | 253,783,701,839 | 106,706,565,799 | 72.5 |
| Passengers carried one mile | 17,353,588,444 | 33,201,694,699 | 15,848,106,255 | 91.3 |
| Gross earnings | $1,588,526,037 | $2,789,761,669 | $1,201,235,632 | 75.6 |
| Operating expenses | $1,030,397,270 | $1,915,054,005 | $884,656,735 | 85.8 |
| Net earnings | $558,128,767 | $874,707,664 | $316,578,897 | 56.7 |
| Operating expenses other than wages of labor (including salaries of officers) | $441,880,186 | $746,451,800 | $304,571,614 | 68.9 |
| Wages of labor | $588,517,084 | $1,168,602,205 | $580,085,131 | 98.5 |

This table shows that while the freight traffic carried increased 72.5 per cent., the passenger traffic carried 91.3 per cent., the gross earnings 75.6 per cent., the total operating expenses 85.8 per cent., the net earnings 56.7 per cent., and the operating expenses other than wages of labor 68.9 per cent., the total wages of labor, in spite of all the improvements made to reduce the cost of labor, increased 98½ per cent. The increase in the cost of labor almost equaled the increases in net earnings and in all other operating expenses combined. Out of every dollar added to gross earnings, 26.3 cents were added to net earnings to be used to pay return on capital, to make additions and betterments, etc.; and 25.3 cents were added to official salaries and to the amount paid for materials, equipment, fuel, etc.; while 48.4 cents were added to the wages of labor. This shows clearly where the money has gone, thereby explaining the present apparent need for higher rates.

This enormous and disproportionate increase in the cost of labor, occurring as it did at the very time when large capital expenditures were being made and innumerable improvements in operating methods were being introduced to reduce labor costs is really astonishing, when you consider it in all its bearings. And is labor now satisfied?

Quite the contrary. It is just as dissatisfied as ten years ago. Almost daily new demands for easier conditions of work and higher pay are presented. An arbitration board has just awarded the conductors and trainmen in the east an advance in wages. The engineers and firemen on all the railways of the west are at this moment demanding substantial improvements in their conditions of work and very large increases in their rates of wages.

Now, how have these disproportionate increases in the cost of labor been brought about? They have been brought about largely by increases in the scales of wages paid, and especially in those of the organized employees. Between 1901 and 1911 the average daily wage of enginemen increased 27 per cent., that of conductors 31 per cent., that of machinists over 35 per cent., that of firemen 36 per cent., that of trainmen 44 per cent. Most of the advances have been made as a result of arbitration under federal law; and the awards have been based chiefly on the ground that there has been a rise in the cost of living.

But if the increases in the cost of living are a sufficient ground on which to base advances in the wages of railway employees, then they are a sufficient ground on which to base increases in the wages of all other working people. The main causes of the past increases in the cost of living have been increases in the prices of the products of the factory and the farm, for the average charges for railway transportation have remained stationary. These increases in prices have affected the cost of living of all alike, and, therefore, if advances were to be made in the wages of railway employees, only, an unfair discrimination would be worked in their favor as against other laboring people. If, on the other hand, general increases in wages occur in all industries the effect must be to increase the cost of production in all industries. But if the cost of production in all industries is increased, then prices in general must be increased, which must cause a further increase in the cost of living, which upon the theory in question, must justify further increases in the wages of labor, which will cause further increases in the cost of living, and so on, ad infinitum.

There is something radically wrong with a theory of wages which leads to such conclusions. The trouble with it is that it assumes that wages should be based almost entirely on the *needs* of those receiving them, whereas they should be based not only on their needs, but also on their *deserts.* Now, their deserts depend on their efficiency as producers, and their efficiency as producers depends on the quantity and quality of the work which they do. Obviously, the smaller the quantity and the more inferior the quality of the work which laboring men do, the higher, other things being equal, will they raise the cost of production and the higher will they make the cost of living; and, in consequence, to increase wages with each increase in the cost of living might be merely to increase wages in proportion as the quantity of work done by those receiving them diminished and its quality deteriorated. It is always most pertinent, therefore, to inquire, when the fairness of past and pending increases in wages is under consideration, not only whether the cost of living has been and is rising, but also whether the quantity and quality of the work done by those asking for the higher wages have been and are changing, and, if so, in what direction.

Railway officers claim that the efficiency of the organized classes of railway labor has been declining; and the evidence indicates that while these classes contain many individual workmen of high efficiency, they have not, as classes, co-operated with the managements in their efforts to promote the economy of operation, but, on the contrary, have antagonized and resisted, and do today antagonize and resist, almost every effort to promote economy. For example, the managements have introduced more powerful locomotives to save operating expenses, and the enginemen have sought to minimize the effects produced by demanding much higher wages for running these engines than for running the smaller engines. In order to effect the economies made practicable by the reductions of grades that have been made, and the more powerful engines and larger cars that have been introduced, it is essential to increase the tons hauled per train without correspondingly increasing labor costs. The trainmen have met the efforts to increase train loads by demanding increases in the number of trainmen employed per train, and, having failed to secure from the managements the concessions sought, they are getting so-called "full train crew" laws passed by the state legislatures throughout the country. In order to effect economies in the shops, the railway managements have tried in greater or less measure to introduce methods of so-called "scientific management." The employees have resisted, thereby making it necessary, where these methods are introduced, for the railways to spend so much money for supervision as largely to nullify the effect of the improved methods. In order to economize in the operation of branch lines some railways have substituted motor cars for steam locomotives and trains; and the engine and train employees have insisted that their "rights" should be extended and their wages applied on these cars, which would largely nullify the possible savings. Similarly, where steam lines have been electrified, the employees have insisted that the high wages of steam enginemen and fire-

men should be applied, rather than the lower wages ordinarily paid to motormen and their helpers on electric lines. And so it has been and is all along the line. The increases in labor costs have been due to these things as well as to the advances in the daily rates of wages.

They have been further due to the general basis on which the wages per day and the overtime payments of employees in the engine and train service have been adjusted. Generally speaking, the basis of a day's wage in engine or train service has been ten hours or 100 miles. In numerous cases, however, employees receive a full day's wage when they have neither worked ten hours nor run 100 miles, and in numerous other cases they receive more than a day's wage when they have neither worked more than ten hours nor run more than 100 miles. Suppose that a locomotive engineer is called to report for duty at point A at 8:00 a. m., but does not leave with his engine until 9:40; and that in the next three hours he runs 100 miles to point B. He has been on duty only 4 hours and 40 minutes, and has run only 100 miles, yet he receives pay for 120 miles, or 20 per cent. more than a day's wage. Why is this? It is because his brotherhood has successfully insisted that he shall receive a day's wage for running 100 miles, and, in addition, two hours' wages for the hour and 40 minutes during which he was on duty before he took out his engine. Suppose, again, that a fireman goes on duty at 8:00 a. m. at A and proceeds to B, arriving there at 9:00 a. m. There is a wreck ahead, and until 2 o'clock he aids in clearing it up, after which he proceeds to C, a distance of 100 miles from A, arriving there at 3:00 p. m. He has been on duty only seven hours and has run only 100 miles, yet he gets 130 per cent. of a day's pay. Why? He receives a day's wage for the 100 miles which he ran, and three hours' pay, besides, for the three hours in which he was engaged in helping clear up the wreck ahead of him. Again, a conductor reports for duty at 7:00 a. m., and is employed on a work train until noon, a period of five hours. He then runs from A to B, a distance of 100 miles, arriving there at 4:00 p. m. He has been on duty only nine hours, and yet he receives 150 per cent. of a day's wage. Why? Because he gets a day's wage for the 100 miles he has run, and additional pay for the five hours during which he was on the work train.

As 100 miles, or ten hours, is the recognized basis for a day's wage, it does not seem that there would be anything unreasonable in demanding that employees should either work more than ten hours or run more than 100 miles before receiving more than a day's pay. The employees have been demanding that in passenger train service 100 miles or five hours shall be the basis of a day's wage. This principle has been recognized in one of the recent arbitration awards in the east, and its application in the west is demanded in the proposals recently submitted to the western roads by their enginemen and firemen. On that basis if a train ran only 50 miles, and from any cause it took five hours to cover that distance all the employees on it would be entitled to a day's wage, and if for any reason it ran only 100 miles in ten hours they would be entitled to two days' pay.

There is something fundamentally wrong with a scheme of wages which works out such results, and the effect of which must be, it would seem, to make the cost of transportation, and, therefore, the rates that must be charged travelers and shippers for it, excessive in proportion to the amount of labor actually done to produce it.

The demands which the western enginemen and firemen are pressing on the railways, and which doubtless in a short time will be a subject of general discussion or of arbitration, afford many striking illustrations of the efforts constantly made by the brotherhoods to increase the wages received by their members for doing a given quantity and quality of work, or to reduce the quantity and quality of work done by them for a given wage. For example, they demand wages 23 to 50 per cent. higher for running Mallet engines than for running other freight engines. Now, that there ought to be some differential probably is true, and there already is one; but that the differential should be from 23 to 50 per cent. does not seem reasonable. Again, they demand pay for 30 minutes' preparatory time in addition to pay for their regular day's work. In other words, although ten hours or 100 miles is the basis of a day's wages, they insist that if a man comes on duty at 9:00 a. m., and then runs 100 miles in, say, six hours, he shall be paid a day's wage and for 30 minutes' time besides. Take another illustration. Suppose the employee's train is scheduled to depart at 9 o'clock; that it does not leave until an hour later; and that it runs 100 miles in four hours. Under existing schedules the employee would receive a day's wage for running the 100 miles in four hours and 10 per cent. additional for the hour which he waited; and if the pending demand of the employees should be granted he would receive, besides, additional pay for his 30 minutes' preparatory time, although the whole time that he was on duty would actually be only five hours.

It is ordinarily assumed that controversies arising between the railways and their employees regarding wages and conditions of employment, and especially the details of such controversies, are of interest and concern only to them. What has been said shows that these things are of vital interest and concern to the public generally. The changes in wages and conditions of work have not yet caused increases in the average passenger and freight rates, which are about the same as they were ten years ago. But it is perfectly evident from a study of the statistics that the time is here when the various conditions which are operating on the railways, and especially the increases in the cost of labor, already prevent reductions and must compel increases in railway rates. The public is already sharing with the railway companies, and must share in a larger measure, in bearing the burdens imposed.

No one can rationally or fairly blame railway employees for organizing. If we were railway employees we doubtless would belong to the brotherhoods. Nor can anyone rationally criticize the employees for seeking higher wages when they believe they are entitled to them. But the public has a right to insist that railway employees shall not be unreasonable in their demands, and it is its right and its duty to itself to provide means for ascertaining whether their demands and conduct are reasonable and to help to make them so. It is not right or expedient that any class in a community should get more than it is entitled to, because when it does it takes the excess from those who have a better claim to it. Now, many railway labor controversies are settled by arbitration at present. But the situation with respect to arbitration cannot be regarded as satisfactory. In the first place, either party can refuse mediation or arbitration, thereby precipitating a strike or lockout and a railway tie-up which may be exceedingly costly to the public. The enginemen, firemen, conductors and trainmen on the Sunset Lines in Texas only recently struck after the railway had asked mediation under the federal law and the proper federal officers had tendered such mediation. Furthermore, even when these controversies go to mediation or arbitration there is no adequate machinery for settling them on their merits. The awards now made are usually mere compromises which really settle nothing, but which almost always cause increases in railway expenses.

It would seem, therefore, that the time has come when travelers, shippers and the public generally should begin to take a very active interest in the question whether the employees of railways are not demanding and getting too much or giving too little for what they get; for in the long run public opinion settles matters of this kind; and also in the long run, in the form either of freight and passenger rates or of stunted railway facilities, the public will pay every cent which is added to the cost of railway labor. It would seem, also, that the time has about come when strikes and lockouts on railways before arbitration should be prohibited as contrary to public policy, and when some permanent body such as the Interstate Commerce Commission should be empowered scientifically to investigate and pass on the

merits of the demands made by employees on the railways and by the railways on their employees. It seems highly improbable that these labor controversies ever will be settled in a way that will be just and expedient until they are investigated and determined on their merits, just as railway rate controversies are now investigated and determined on their merits. Of course, the labor brotherhoods will oppose any such legislation. But will there be any more merit in their opposition than there was in that offered by the railways to the proposal to give the Interstate Commerce Commission power, when it found a rate unreasonable, to fix a rate that was reasonable? And when these labor controversies are investigated on their merits, the investigators will not stop when they have ascertained whether the cost of living has increased, but they will also inquire whether the quantity and quality of the work done by railway employees has changed, and, if so, in what direction. And while shippers, travelers and the public generally are considering these matters, it will be well for them to consider also the activities of the lobbyists of the railway brotherhoods in securing the passage of legislation which tends to increase railway expenses. Our friends among the shippers are quick to appreciate the effect which may be produced on their businesses by an increase in railway rates. They have heretofore been much less quick to think and act when railway employees have knocked at the doors of state legislatures and Congress demanding legislation adapted to increase railway expenses and thereby to interfere with reductions or compel increases in railway rates.

As already indicated, railway patrons are interested in the same degree in the influences which affect the safety of transportation as in the influences which affect its cost. Now, it cannot be controverted that the accident record of the railways of this country is very unsatisfactory. More than one-half of the fatalities are due to trespassing, which can be stopped only by the passage of better laws and their enforcement. A very substantial number of accidents are due to defects of the physical plant. But the large majority of them, other than those due to trespassing, are due to careless or reckless conduct of employees. The only way to remedy the accidents due to physical defects is to make large additional investments for improvements in the plants. Unwise and unnecessary increases of expenses, as well as unwise and unnecessary limitations of rates and gross earnings, restrict the net earnings from which all the money for improvements must directly or indirectly come. When, for example, railway employees secure legislation requiring additional men in train crews and thereby increasing operating expenses, they make encroachments on net earnings which reduce the money available with which directly or indirectly to install block signals, buy steel cars, eliminate grade crossings, and so on. Again when the employees fail to give to the companies and thereby to the public the careful and loyal service which they should, and their brotherhoods interfere with the discipline which properly should be administered for careless or disobedient conduct, they unnecessarily increase both the expenses of operation and the danger of accidents. It often has been charged that the brotherhoods through their grievance committees have interfered with discipline. The charge often has been denied. The evidence is against those who make the denial. Some specific examples will throw light on the question. The purpose of block signals is to inform trainmen, and especially enginemen, whether the track ahead is in shape for them to proceed. It is essential to safety that these signals be implicitly obeyed. In order to ascertain whether they are being obeyed, railway managers have found it necessary to make surprise signal tests; in other words, deliberately to set the signals against the enginemen and observe what they do. The employees, and especially the enginemen, protest against surprise tests, and one of the demands made by the enginemen and firemen in the negotiations pending at this moment between them and the western railways is that the practice of conducting surprise tests shall be eliminated. Whatever may be the reason avowed for this opposition to surprise tests, the real reason appears to be that by means of them employees who are disregarding signals are detected and made subject to punishment.

Is it not about time that the public began to appreciate the close relation between the railway accident record and the attitude and conduct of the railway employees and their brotherhoods? The great weakness of the railway managements in dealing with questions of discipline heretofore has been want of understanding of these matters on the part of the public, and consequent fear on the part of the managements that in case of strikes public sympathy would side with the strikers.

We will approach more intelligently and discriminatingly these questions pertaining to the relations between the railways and the public, on the one hand, and the railway employees, on the other, when we get clearly and kept firmly in mind the fact that human nature is the same in all the walks of life, and that, therefore, it is just as easy and natural for a large number of men who are organized into a labor union to be unreasonable as it is for a large number of persons who are organized into a corporation to be so; and that it is just as easy and natural for the men higher up in a labor brotherhood to abuse their power and disregard the rights of others as it is for the men higher up in a railway corporation to do so. And when the members and officers of a labor brotherhood are unreasonable and unfair it is just as much our duty to criticize them and just as much the duty of the public to itself to check them, as it is our duty to criticize and check the officers and stockholders of a corporation when they are unreasonable and unfair. It seems to be assumed that it is to the public interest to let railway labor have almost everything it wants, while it is not to the public interest to deal similarly with the investors in and officers of railway corporations. The fact, however, is that the investors in and managers of railways are at least as numerous a body of the citizens of this country as the employees of railways, and that, therefore, there is no public interest served by letting railway employees have anything to which they cannot show a clear right, any more than there is a public interest served by letting railway security-holders have anything to which they cannot show a clear right. The interstate commerce act provides that when railways seek to make an advance in their freight rates the burden of proving that the advance is reasonable lies on them, and this in spite of the fact that railway rates are as low today as they ever were in the history of the United States. In view of the fact that the wages of railway employees have been very greatly increased in recent years, and that changes in their wages and conditions of work are made, in the long run, at the public expense, does it not seem that the time has about come when the public may properly say to them that upon them also the burden of proof now rests and that they must clearly demonstrate their right to any further ameliorations in their conditions of work and increase in their rates of pay before they should or will be granted?

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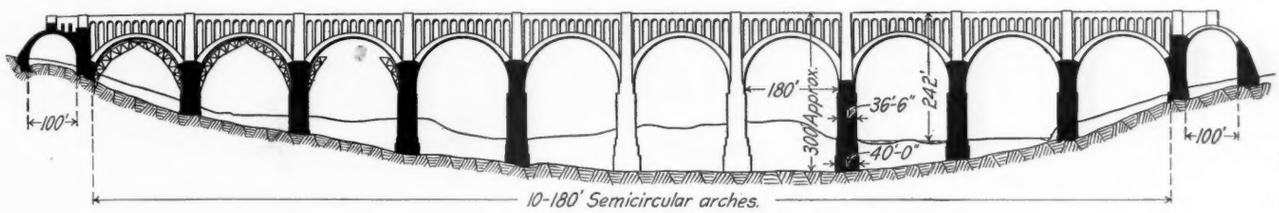
Earnings of South Australian Railways.—The year ending June 30, 1913, was a notable one for the South Australian government railways. For the past nine years they have been earning profits of 5 per cent. and more on the investment and this has been more than sufficient to cover the current interest on capital. There were, however, arrears to make up in the shape of sums expended by the government in former years for railway interest out of general revenue. During the year under review these arrears were wiped out and the railways are left for the first time in their history with a credit balance amounting to $1,310,505.

# SUMMIT-HALLSTEAD CUT-OFF OF D. L. & W.

**Second Article on this Improvement Work Describing the Largest Concrete Arch Bridge in the World and Other Structures.**

The unusual operating economies which will be effected on the Delaware, Lackawanna & Western by the expenditure of about $12,000,000 for replacing 40 miles of line between Clark's Summit, Pa., and Hallstead, and the interesting features of the heavy grading and tunnel work now under way on this section, were described in the *Railway Age Gazette* of November 14, 1913. The present article takes up the bridge work that has been done on this line up to the present time, dealing only with the substructures of the two concrete arch viaducts which are exceptionally large and will require a considerable time for their completion. When the superstructures of these bridges have been sufficiently advanced, another description will be presented covering the design of the entire structures and the contractors' methods as developed during the course of the work.




**Elevation of Nicholson Viaduct, Showing Progress to November 1.**

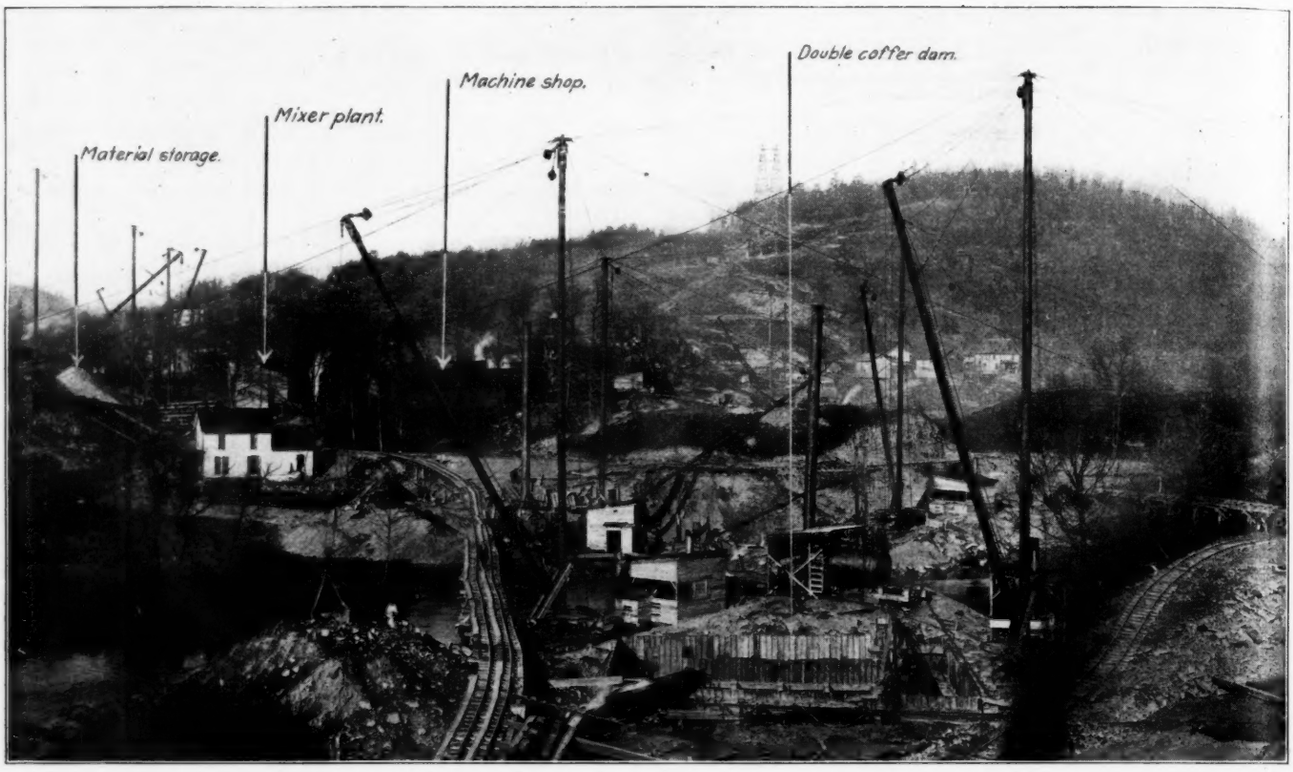
The two concrete viaducts over Tunkhannock creek and Martin's creek will require about 167,000 and 78,000 yds. respectively, and the minor structures which are about 80 in number, will require 155,000 yds. of concrete, making a grand total of 400,000 yds. exclusive of tunnel lining and other minor quantities. All highways on the new line are carried either over or under the new grade. The elimination of these 22 grade crossings was an important consideration in making the improvement, as all of these would have required elimination in the not very distant future. All structures carrying the roadbed will be of concrete except where the available clearance is not sufficient to permit the use of an arch or reinforced slab, or where the foundation is of such a nature as to make it inadvisable to use a concrete structure.

All structures were built to the same standards and specifications that were used on the Hopatcong-Slateford cut-off (see *Railway Age Gazette* of December 6, 1912, and January 3, 1913), except that cement is required to leave not more than 22 per cent. on the 200 sieve and to pass the auto-clave test. This test is carried out as follows: Six neat briquettes are made in the usual manner and placed in a damp closet for 24 hours. They are then removed and three of them broken in the standard tension machine in the usual manner. The other three are placed in an auto-clave, heat applied, and the pressure gradually raised to 295 lbs. in 1 hour. This pressure is maintained for 1 hour and then gradually released. The briquettes are taken out, allowed to cool and then broken in the standard machine. The average of the three briquettes taken from the auto-clave shall show an increase in tensile strength of at least 25 per cent. as compared with the average of the three briquettes tested in the usual manner.

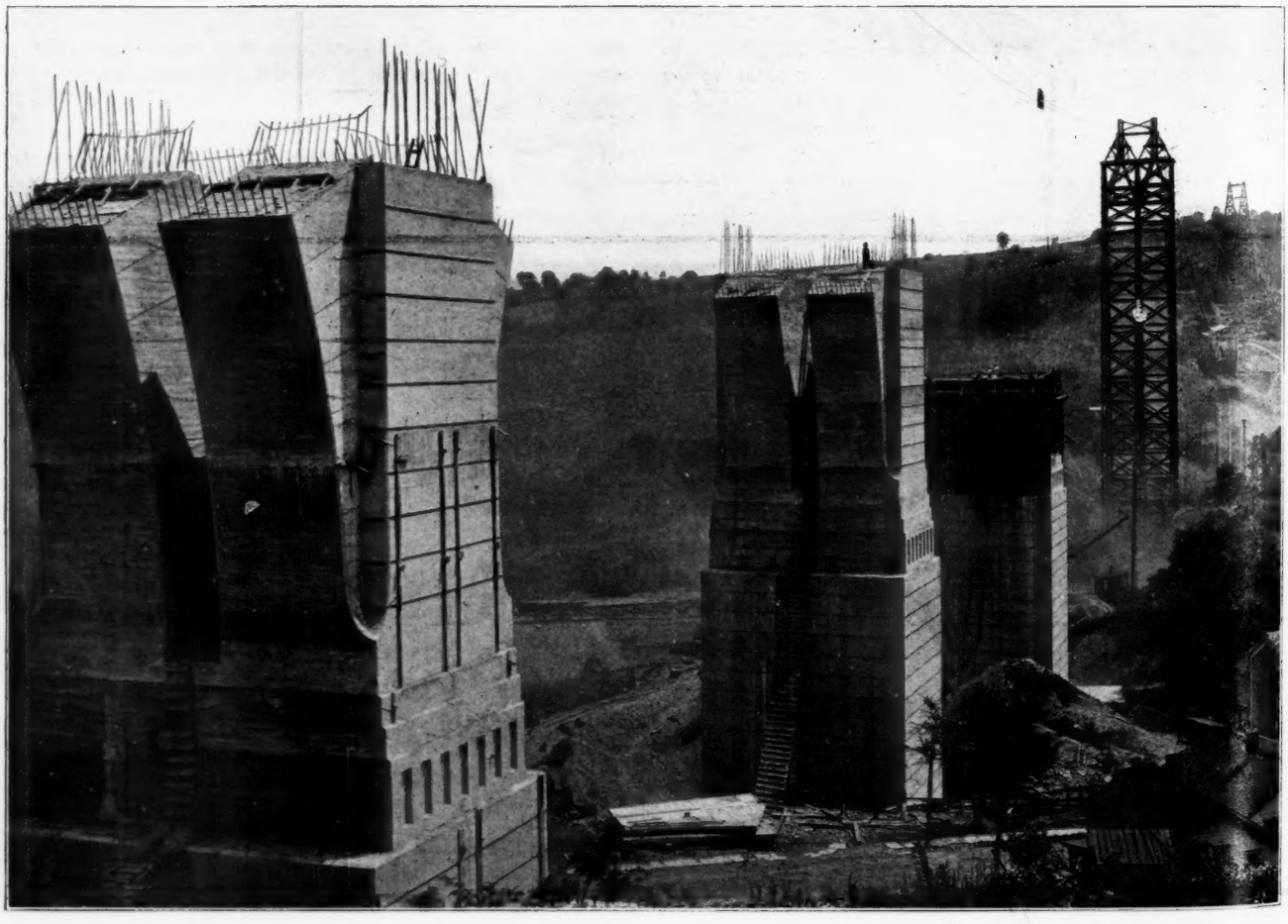
### TUNKHANNOCK VIADUCT.

The Tunkhannock creek structure is 2,375 ft. long, end to end, of masonry, and 242 ft. from top of coping to stream bed,


**General View of Tunkhannock Viaduct Location, Showing End Tower and Operator's House of Material Cableway in Foreground**

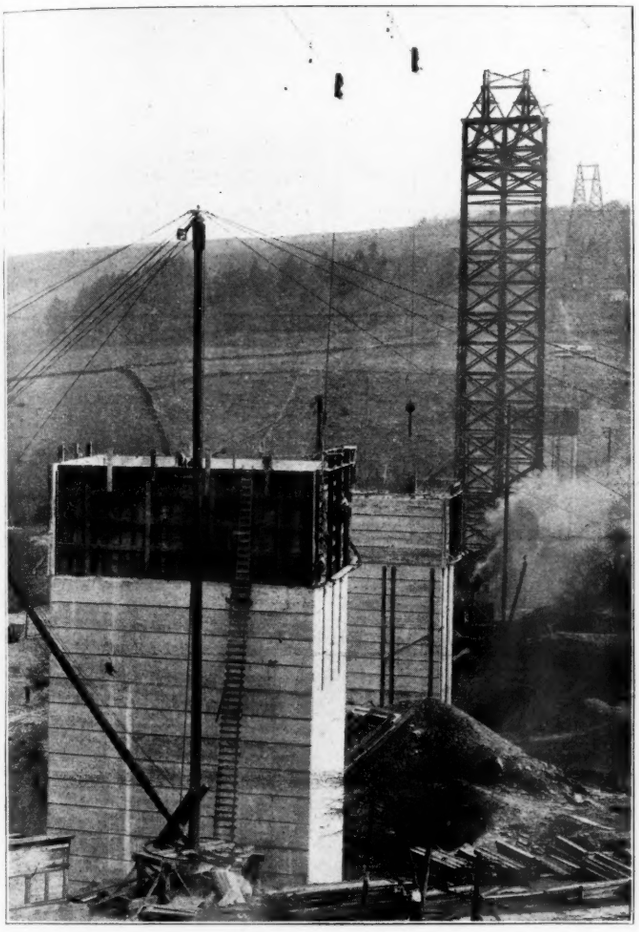



**Looking Along Center Line of Tunkhannock Viaduct in Early Stages of Construction.**



**Two of the Tunkhannock Viaduct Piers with Umbrella Sections Completed.**

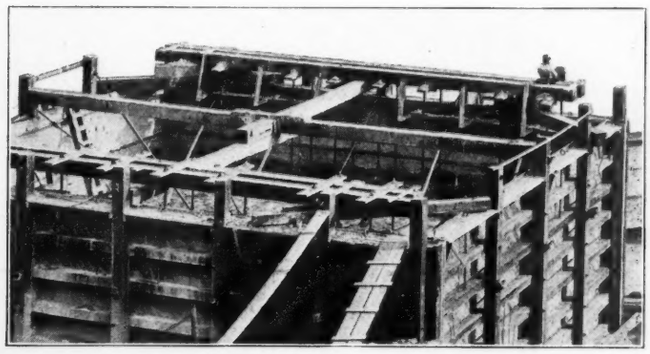
which will be the largest concrete arch bridge in the world. It is composed of ten 180-ft. semi-circular intermediate arch



**Showing Sectional Pier Forms and Double Cableway.**

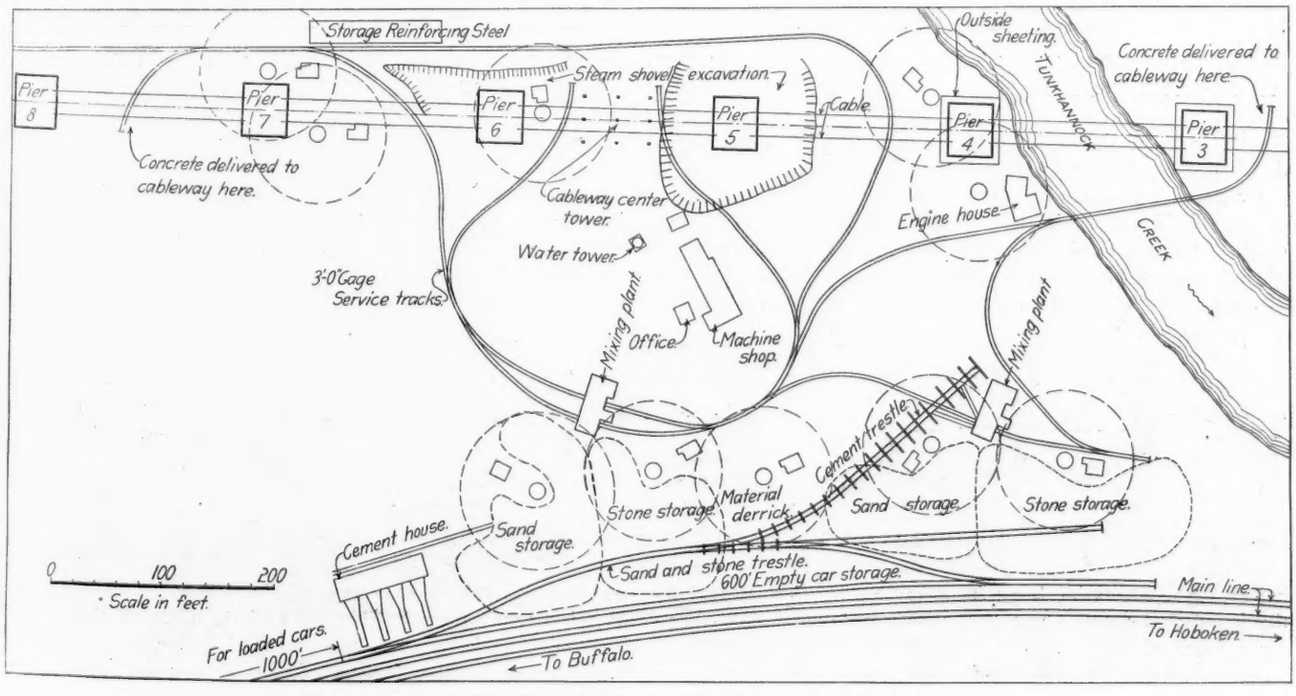
spans and two 100-ft. semi-circular abutment spans, being designed to carry two tracks. The abutment spans will be buried in the end embankments so that they will not be apparent after the work is completed. This viaduct will contain approximately 167,000 cu. yds. of concrete, 2,275,000 lbs. of reinforcing steel and will require the excavation of 43,500 cu. yds. of material for the foundation.

The piers are 36 ft. 6 in. x 43 ft. 6 in., and are solid below the springing line. The higher piers are 40 ft. x 46 ft. below the ground line, and all piers are carried down to rock, which is reached at a depth of 10 to 95 ft. below the ground surface, making the difference in the elevation between bed rock and top of coping at the deepest piers about 300 ft. With the exception of the abutments, one pier at each end and three other piers,



**Looking Into One of the Pier Forms, Showing Reinforcement and Form Bracing.**

the foundations were excavated down to water level or to rock by a Model 40 Marion steam shovel, using a one-yard dipper. The material encountered was sand and gravel and was allowed to take its natural slope. In most cases the shovel was allowed to cut its way from pier to pier, and the material was used in filling under the temporary material tracks. The abutments and four piers were built in open excavation without sheeting. For the other piers, interlocking steel sheet piling were driven by a steam hammer. The deepest foundations required two lengths of 30 ft. sheeting, the upper set being driven 4 ft. 6 in. outside the lower to give clearance for the hammer and leads. The inner set was driven first and the excavation carried down with the driving. When the outer set was started both were carried



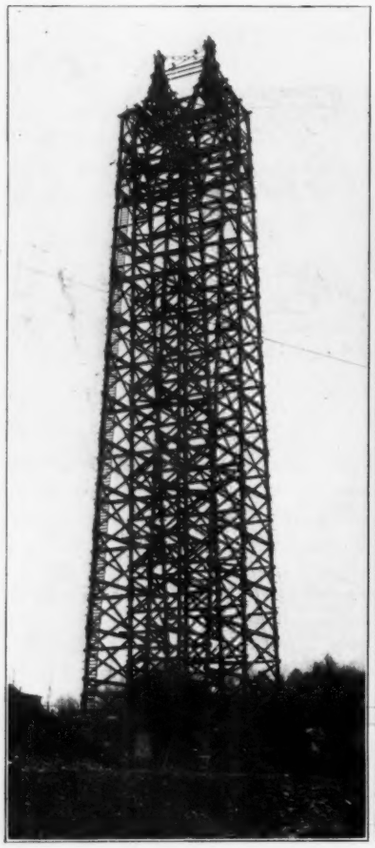

**Arrangement of Contractor's Plant at Tunkhannock Creek Viaduct.**

down together, the bracing for the upper set being entirely above the tops of the lower piles so that there was no interference between the two sets of bracing.

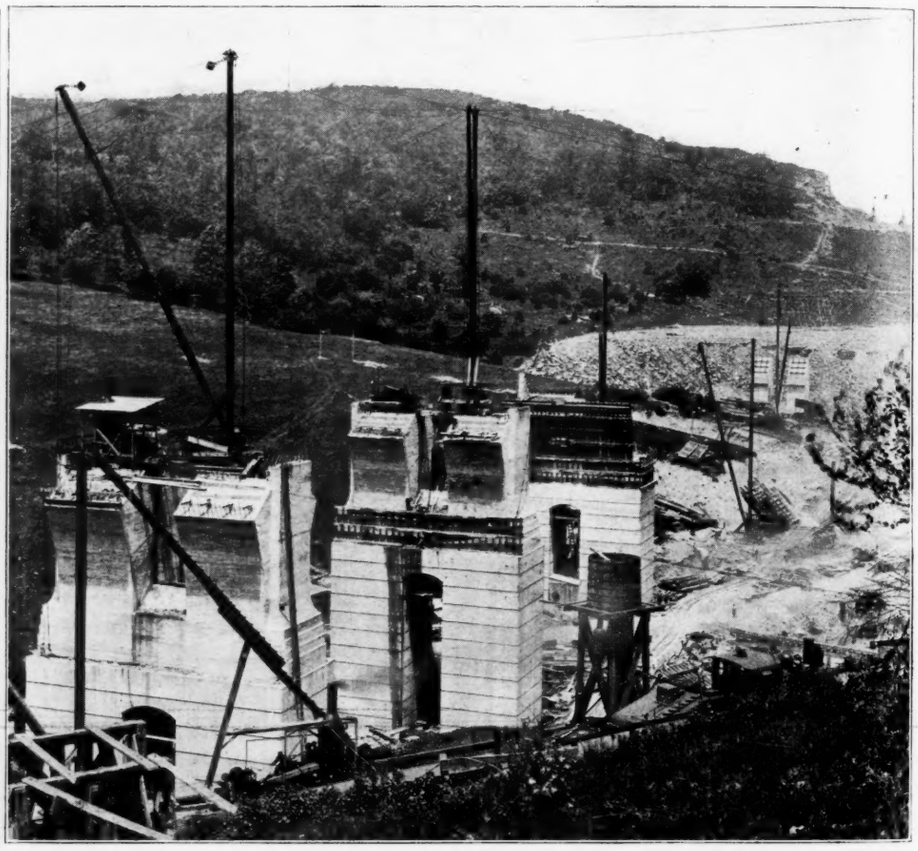
The soil through which these cofferdams were driven was largely wet sand, making the pressure unusually high on such deep excavations. Considerable trouble was experienced in one of these deep piers on account of the shifting of this pressure, causing damage to the piles and allowing water to enter. The material was removed by clamshell buckets, some boulders being removed by hand.

In placing concrete after excavation was completed to rock the water collected in the cofferdam was carried around by a timber drain to a sump in which pumps were placed to remove it. No concrete was placed under water. The footings up to the bottom of the neatwork were placed without forms, the entire cofferdam being filled with concrete up to this level after tar paper had been placed against the steel to prevent the bonding of the concrete to the piles. In order to pull some of the sheeting an eight-part tackle hung from an "A" frame supported on the foundation concrete was used which made it possible to apply a force of 40 tons. The neatwork up to the ground level was placed in rough cribwork forms.

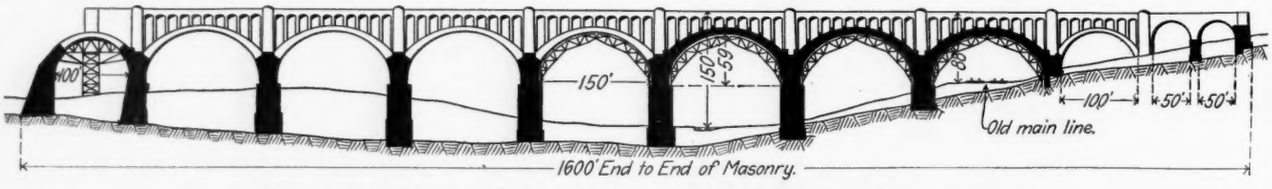
Only the substructure work which extends up to a point about 37 ft. above the springing line of the arches will be considered at this time. The piers have a 4-ft. offset on each side at an elevation 17 ft. 6 in. below the springing line to support the arch centers, but the 37-ft. section above the springing line is built as a part of the piers, this so-called "umbrella" system being similar to that used on the Delaware river bridge of the Philadelphia & Reading, described in the *Railway Age Gazette* of April 25. The forms used on the bodies of the piers are built up in ten sections 17 ft. 9 in. high in which a 16 ft. lift is made. These sections can readily be handled by the derricks and are used a number of times. The framing of these forms is of 8 in. x 10 in., and 6 in. x 8 in. timbers, with two diagonal layers of 1 in. sheeting, faced with galvanized sheet iron. The inner faces of the forms are provided with strips of molding at 4 ft. intervals to form the horizontal scoring on the shafts of the piers. A system of 3½ in. x 3½ in. angles is used for bracing the forms. These angles are set in the concrete after every lift of 4 ft., and are fastened by bolts in the next lower lift which are attached to the bent ends of the angles. Each form section is held in place by three sets of these angles, the connection being made by short rods attached to the angles by turnbuckles. The angles are placed diagonally from all faces so that a firm bond to the body of the concrete is secured.



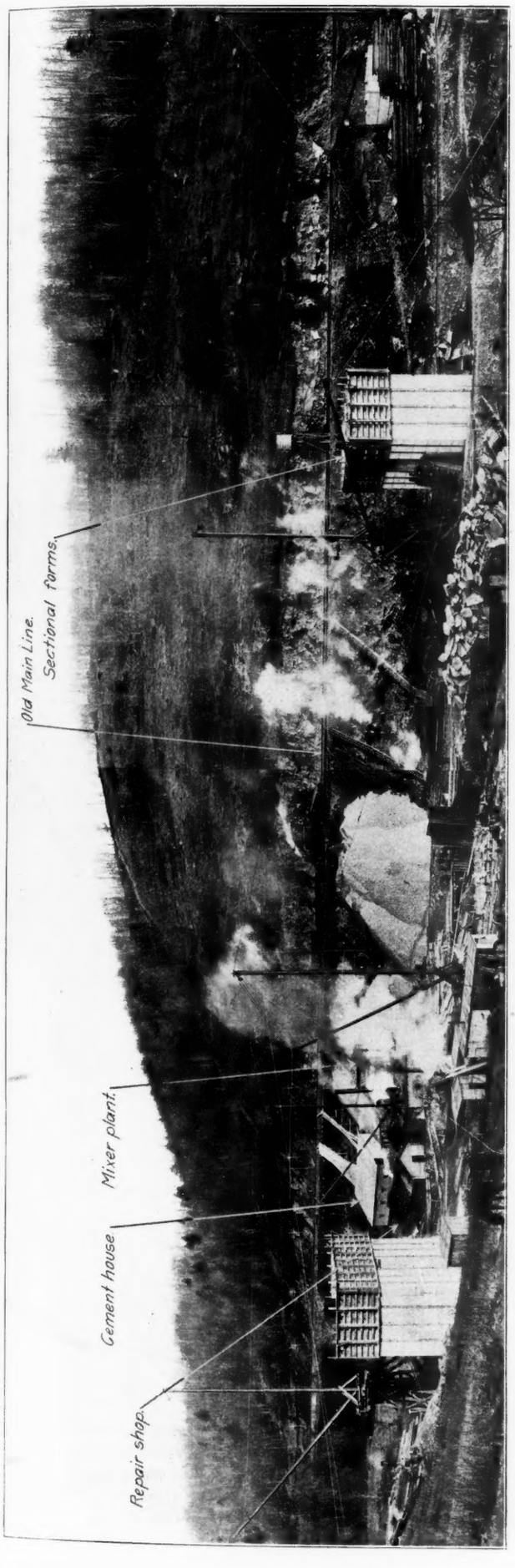
**Framed Tower 260 ft. High for Center Support of Material Cableway.**



**Partially Completed Piers of the Martin's Creek Bridge. The Umbrella Forms Are in Place on the Third Pier.**




**Elevation of Martin's Creek Viaduct, Showing Progress to November 1.**




General View of Martin's Creek Viaduct Site Showing Contractor's Plant.

The material is being handled by a combination of derricks and a double cableway over the center line of the bridge. The cableway is supported on three framed towers, and is composed of two 2¼-in. cables placed 20 ft. center to center. The end towers are 3,028 ft. apart, and are 150 and 165 ft. high respectively. The center tower is 260 ft. high and 40 ft. x 60 ft. at the bottom, dividing the cableway into four independent operating units. The cables are designed for an average working load of seven tons and a maximum load of 10 tons. An operator's house with two independent hoisting engines is located back of each end tower, one of these being shown in the foreground of the accompanying photograph. The construction of this cableway in itself is an unusual feature of the work. The total length is thought to be the longest ever attempted for cable operation, and the height of the center tower the greatest ever used to support a cable. The complete cable equipment was installed by the Lidgerwood Co. It will be necessary before the completion of the superstructure, to add a section on the top of the center tower, this addition being provided for in the design. On account of the distance between the operator's house and the points of loading and unloading the cables, it was found necessary in order to operate successfully to install a complete telephone system so that the operators could receive all signals from the men at the loading and dumping points by telephone. The operators are provided with head sets, which allow the free use of both hands for operating the engines.

The contractor's plant is complete in every detail and is carefully designed to allow the most economical handling of material. All material is delivered on a 1,600 ft. side track adjacent to the old line, which is about 300 ft. from the new bridge. As an indication of the amount of material handled by this plant, 635 cars of material have been delivered to this siding in a single month. The sand and stone which are brought in bottom dump coal cars are dumped into storage piles from a material trestle about 30 ft. high. A 4,000-bbl. cement house with four covered chutes is provided for the storage of cement for mixing plant No. 1, and a trestle is carried out to plant No. 2, which allows the cement to be handled directly from cars. Derricks operating clamshell buckets are located at convenient points between the storage piles and cement house and the mixing plants to elevate the sand, stone and cement to material bins or the charging floor.

The two mixing plants are duplicates and are housed in frame buildings 40 ft. high, allowing the operation of narrow gage cars carrying concrete buckets directly under the mixers. Each plant has a capacity of about 40 cu. yds. per hour. The charging hoppers over each mixer are bulkheaded vertically to separate the sand and stone, a system which has proved much more effective in the proper proportioning of the materials than the horizontal gage lines frequently used. The cement is distributed evenly over both the sand and the stone. Cube mixers receiving water through the main trunnion are used. The plant is carefully designed as to all its details, the provision for inspection, for instance, being so carefully arranged that one man standing near the charging hopper can watch the proportions in the hopper, the water gage and all the points which should come under his attention. Live steam is piped to the material bins for use in freezing weather.

Each of the mixer plants is designed to serve half of the structure, but the track layout is arranged so that the output of either plant can go to any point on the bridge. The concrete is taken from the plants in 2-cu. yd. bottom dump buckets carried on 3-ft. gage flat cars propelled by dinky locomotives. These locomotives deliver concrete either to derricks located near the piers or to the cableway, a number of tracks having been laid out for the purpose of delivering these buckets to the cableway at convenient points. The general layout of the contractor's plant is shown in the accompanying drawing.

Three grades of concrete known as "A," "B" and "Cyclopean" are used in this structure, class "A" being a 1:2:4 mixture,

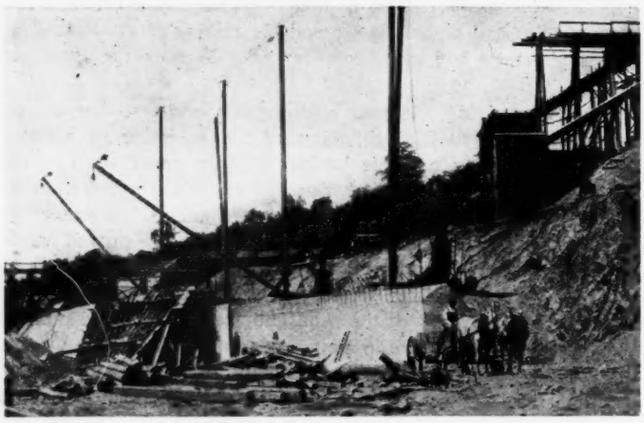
which is used on very thin heavily reinforced walls; class "B" is a 1:3:5 mixture, which is used for the arch rings, floor system, and all work above the springing line, except where class "A" is specified; "Cyclopean" is the same mixture as "B," with large derrick stone bedded in the concrete, and is used in most of the work below the springing line. This work, which is being handled by Flickwir & Bush, New York, was begun about August, 1912, and more than 85 per cent. of the foundation excavation has been finished, and more than one-third of the total yardage of concrete placed.

MARTIN'S CREEK VIADUCT.

The bridge over Martin's creek is about 1,600 ft. long and is being built for three tracks. The top of rail on the new structure is 150 ft. above the bed of the stream and 88 ft. above the old tracks. It is composed of two 50-ft. and two 100-ft. semicircular arches, and seven 150-ft. by 59-ft. three-centered arches. The structure is similar in general design to the Tunkhannock bridge, and will require about 27,000 cu. yds. of foundation excavation, 78,000 cu. yds. of concrete and 1,600,000 lbs. of reinforcing steel. About 85 per cent. of the foundation excavation is completed and nearly one-third of the concrete is in place.

The main piers are solid for 17 ft. below the springing line and below that elevation they are divided into two legs 23 ft. by 28 ft., separated by a 12-ft. opening. All piers are built on solid rock, which is reached at an elevation varying from 10 to 60 ft. below the ground surface. A steam shovel was used to excavate these foundations down to the water line, and Lackawanna sheet piling were driven by a 6,000-lb. Vulcan hammer below the water line.

The contractor's plant for this structure is almost identical with that in use at the Tunkhannock viaduct, except that no cableway is used, all material being handled by trains and derricks. Two sidings are provided along the old line opposite the new bridge, one over the storage piles and one which is used for holding cars temporarily. A 3,000-bbl. cement house with two chutes is provided near the sand and stone storage piles, as shown in the accompanying photograph. The mixer



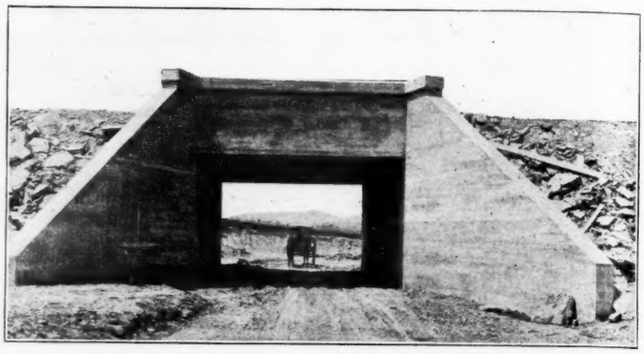
**Contractor's Layout for Arch Under Smith Fill.**

plant, which is a duplicate of the ones used at Tunkhannock, is located near enough to the storage piles to be served by derricks. On account of the number of narrow gage tracks around the mixer plant the contractor installed an eight-lever interlocking plant to handle all switches in these tracks. One man located on a platform raised slightly above the track level handles all the switches more easily and more rapidly than if they were hand thrown, and on account of the large number of movements that are made over these tracks the machine is an important safety factor.

For the early stages of the piers all material was handled by derricks located in each span. After the completion of the umbrellas on the base of the piers, derricks will be erected on top of this masonry which will be allowed to remain there to handle the concrete for the superstructure. A saw mill, a complete machine shop and a power plant for generating electric light are included in the contractor's layout. This work is being handled by the F. M. Talbot Company, New York.

OTHER STRUCTURES.

The 30-ft. roadway arch under the Smith fill was handled in a manner typical of a large part of the concrete work on the minor structures. The concrete plant was located on the north side of the arch, all materials being brought in by narrow gage cars to the top of the adjacent fill, from which they were chuted down to the storage bins above the mixing plant. Four der-



**A Typical Highway Undercrossing.**

ricks, two with 78-ft. and two with 68-ft. booms, were located back of the north abutment and were used for handling the concrete from the mixing plant, and also for handling the Blaw steel forms. The ¾-yd. mixer dumped into 1-yd. buckets carried on small flat cars, which were run out on a short section of track from the mixing plant to the edge of the arch excavation, where they could be reached by the nearest derrick. To place the concrete in the ends of the arch the center derricks had to swing these buckets out to a point from which they could be reached by the end derricks. In this manner this plant is able to place about 275 yds. a day. The forms were placed 5 ft. center to center, and 3¼-in. lagging was used. The form work was erected in 50-ft. sections, and the concrete was poured in sections 40 ft. long. In turning the arch, from 10 to 12 hours were required to pour one of these sections.

The concrete arch which carries a highway under the Riker fill was shown in the photograph accompanying the former article. The materials for the arch were brought in on the old line and carried up from the siding on a narrow gage incline, across the new line, and out over the new location of the highway on a trestle, which allowed sand and stone to be dumped to the storage piles. The mixing plant is located adjacent to those storage piles and the derricks shown in the view were used to place the concrete in the arch. At Alford on section No. 9 a double culvert was adopted carrying a roadway and waterway under the line in a single structure. The roadway occupies a 24-ft. arch and a 4-ft. by 6-ft. culvert below the roadway provides for the stream.

The entire work of building this cut-off was planned and is being executed under the direction of G. J. Ray, chief engineer. F. L. Wheaton is engineer of construction in immediate charge of the work, and A. B. Cohen, concrete engineer, is in charge of the masonry designs.

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Car Lighting in Java.—In Java railway trains are not operated at night; that is, from 7 p. m. to 5 a. m. Therefore very little provision is made for lighting passenger coaches. An acetylene plant has recently been installed, however, at Bandoeng, which has a capacity of 15 tubes per day, compressed to 220 lbs. per sq. in.; and acetylene lighting apparatus is being substituted for oil lamps in the cars of the through trains.

# INSIDE SHEATHED STEEL FRAME BOX CARS.*

**Care Necessary in the Selection and Treatment of Lumber for Sheathing; Corrugated Metal a Successful Substitute.**

By R. W. Burnett,
General Master Car Builder, Canadian Pacific, Montreal, Que.

The original wooden car, with the single spring draft rigging having the cheek castings bolted to the sills, gave little if any more trouble than modern equipment, due principally to the shorter trains, less density of traffic and to the use of link and pin couplers which compelled gentler handling of trains than is prevalent today. The steel underframe car was built mainly to secure a stronger center construction for the attachment of draft rigging and to get away from the trouble caused by wooden sills breaking and splitting, broken draft bolts, etc.

While having many advantages over the old wooden car, the steel underframe car developed some troubles peculiar to itself, the most important being due to the fact that the body being carried on a rigid frame and not held together by the strains resulting from its weight, as in the old trussed cars, has a tendency to develop slack in the superstructure. This in turn affects the roof and sheathing. One principal trouble with outside sheathed cars is that, after they have been in service a comparatively short time, the sheathing frequently loosens at the end sill and at the side sills near the bolsters with resultant leakage of grain.

There were some steel frame box cars built previous to 1909, but the writer has been able to secure data on only the outside sheathed types. Of these 2,700 were in service on the Norfolk & Western, of which the first 100 were built in 1902; the owners state that they were satisfactory and the same type has been purchased on subsequent orders. The Rock Island and Frisco lines had in service at that date approximately 5,000 cars similar to the Norfolk & Western, and these also appear to have given satisfaction as the owners have reordered the same type several times. All of these, however, were outside sheathed and as regards leakage at the sills, had comparatively little advantage over the wooden cars. Recently both of these lines have purchased some inside sheathed cars. The Frisco car of this type is fully described in the *Railway Age Gazette,* October 3, 1913.

In 1908 the Canadian Pacific designed its first steel frame inside sheathed box car. This car avoided the disadvantage of the outside sheathed car, and at once obtained a further reduction in weight and provided for cheapness of maintenance by the use of steel superstructure without the additional lumber required by the outside sheathed car. With practically no preliminary experimenting 500 of these cars were built, and since then over 30,000 have been built similar to the first cars, with the exception of several refinements of details, such as corner and door posts, end doors and side plates, and the joining of flooring and lining. These changes have not affected the general design of the car, but are the improvements that have been introduced from time to time to reduce weight and simplify the construction.


**Canadian Pacific Steel Frame Box Car with Corrugated Metal Sheathing.**

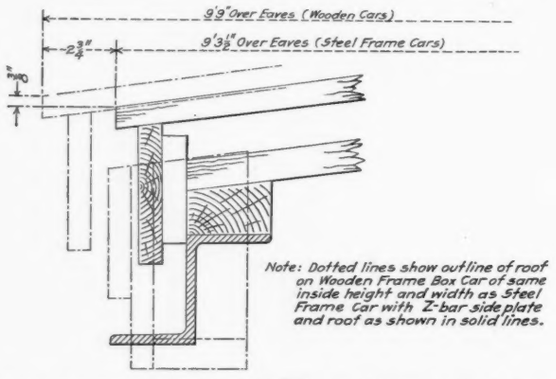
### ADVANTAGES OF THE STEEL FRAME CAR.

The steel frame inside sheathed car has several advantages over the types previously used, notably in that the tare is low in proportion to the capacity. There is such a variation in the figures used for the cost of hauling per ton mile, that no attempt is made to say what the saving would amount to, but certainly the advantage of having a car equal, if not superior to other cars in all respects, and weighing from 1,000 to 5,000 lbs. less, will appeal to all traffic and operating men. Not only is there that much less dead weight to haul when the car is empty or partly loaded, but additional lading can frequently

*Extracts from a paper read before the American Society of Mechanical Engineers at the annual meeting, December 3, 1913.

be carried. The actual limit on the paying load that can be carried in a properly designed car is the total weight on the axles. Thus, a car having 5 in. x 9 in. axles with such a tare weight that, when deducted from the capacity of the axles, allows the car to be safely loaded to 88,000 lbs. could, if dead weight be reduced by 3,000 lbs. safely carry a paying load of 91,000 lbs. and retain the same strength. Thus the actual capacity of the car is increased almost 4 per cent., with a better ratio of paying to dead load.

It had been thought necessary to assist the wooden type of superstructure by heavy roof construction, some going so far as to use different methods of diagonal bracing, but with the steel car it has been found that there is no appreciable local movement of the framing in the heaviest service which makes a simple proposition of the roof as it has only to take care of




**Roof Clearances on Steel Frame and Wooden Box Cars.**

itself. This presents a simpler problem to roof designers, making it possible to design a roof much lighter, without necessity for the use of purlins or ridgepoles to strengthen the car. It is obvious that unnecessary weight in the roof raises the center of gravity, increases the tare weight and cost and has other disadvantages.

In explanation of the local movement of this style of framing, it is well to mention tests we have made in jacking up this type of car, which demonstrated that the car would take a gentle twist from end to end, allowing the bolsters to be slightly out of the same plane horizontally. This twisting was accomplished without any perceptible local distortion of the sides or ends. The capacity for twisting is a condition to be desired as it allows a car to adjust itself to uneven track conditions.

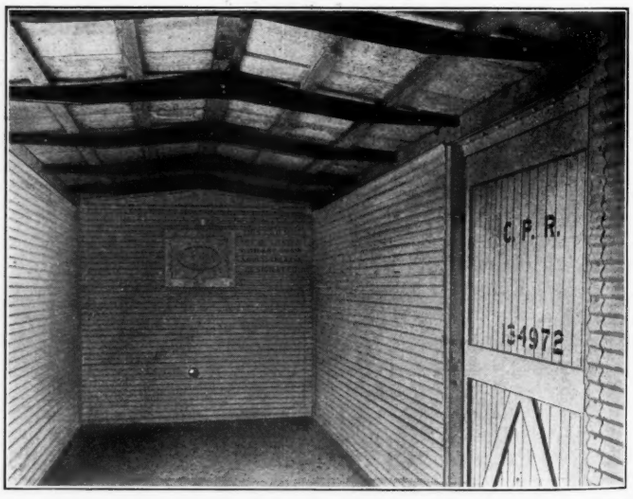
In addition to being 5½ in. narrower than the distance over the outside of the sheathing of a wooden car, the superstructure of the Canadian Pacific car is protected by the framing, so that a side swipe that would do serious damage to an outside sheathed car frequently does not touch the lining and is resisted by the framing without damage to the posts or braces. Frequently it is found that a side swipe that would almost demolish the sides of a wooden car only bends the steel framing, and in making repairs, the lining is merely removed, posts and braces straightened and the original lining replaced, the whole cost being the comparatively small labor charge. Jacking frames are being installed at all of our principal repair points for all classes of steel cars, and while not original with the Canadian Pacific, they have been amplified to better take care of steel frame box cars. With these frames, many jobs that would require the car to be cut apart, taking several days, can be done in a few hours without cutting the rivets. With modern steel frame cars, these jacking frames are as much a necessity as the blacksmith shop or any other part of the shop.

It is difficult to clean an outside sheathed car properly when it is unloaded, on account of grain lodging between the framework and also on account of the opening where the posts and braces meet at the bottom becoming obstructed, resulting in grain being retained between the sheathing and lining with resultant complaints from shippers. All of this is overcome by the clean joining of the lining and the floor in the steel frame cars, and it is believed a change of this kind would have come years sooner if designers had kept in close touch with service conditions. One advantage of the steel frame car is that outside of possible repairs due to wreck damage and to wear and tear of couplers, wheels, brake shoes and journal bearings, the car does not deteriorate more rapidly in service than when stored.

SELECTION AND TREATMENT OF LUMBER.

The grading of lumber for use in these cars is an item that has received much consideration. Yellow pine or fir has so far been the principal lumber used, although we have experimented to some extent with spruce, but although it has the advantage of being lighter, it seems to be more difficult to dry spruce sufficiently for this purpose. Great pains have been taken to avoid knots that are too large or numerous, and while it is generally desirable to have lumber as free from knots as possible, I have never in the inspection of many hundreds of cars seen where a knot had fallen out. It is, however, desirable to have lumber as free from sap and shakes as possible and thoroughly dry.

When the first of these cars were built outside of the Canadian Pacific shops we had considerable difficulty in getting the lumber properly dried, due to lack of both experience and facilities on the part of the car companies. We have about 3,000 cars on which the lumber has shrunk and given them a bad appearance, but this result was expected, as when the cars were built the lumber was quite green. The sheathing on these cars could be tightened for less than $4 per car, but very few have been tightened, owing to receipt of practically no reports of loss or damage to lading due to the shrinkage; also as they do not frequently reach our main repair tracks, being shopped only for such repairs as wheels or wreck damage, we have not considered it advisable to shop the cars for a defect which is




**Interior of Steel Frame Car with Inside Corrugated Metal Sheathing.**

almost entirely a matter of appearance. The lining shrinks as much in two months of summer weather as it ever will.

The lining should not be matched before drying, as it warps and curls, rendering it difficult to make a tight joint. The rough size of lumber should be at least ¼ in. greater than the finished dimensions. In establishing limits for drying lumber no information or data whatever could be secured, and after experimenting we came to the conclusion that a piece of this lining of full cross-section subjected to a temperature averaging 170 deg. F. for 96 hours should not lose more than 6 per cent. in weight and that lumber represented by samples losing more than 10 per cent. must not be used until further dried.

### DEVELOPMENT OF A STANDARD CAR.

The development of the inside sheathed car has been so rapid and the experience with it so uniformly satisfactory, that I feel safe in saying that its introduction in such large numbers on so many roads in so short a time indicates more nearly a tendency toward the adoption of a standard car than has any distinct type of car outside of patented cars for special service. It is certain that there will be no backward movement to a wooden superstructure, and that this car with possible modifications will remain a standard car unless some superior type of car is developed. It is the writer's opinion that no committee will ever develop a car that will be adopted as standard, but that the nearest we will ever get to a standard is what may be developed by one or two persons given a free hand, and the merit of which is so pronounced that it forces itself upon the country.

With the use of structural steel there is less necessity of carrying special parts in stock on account of repairs being largely a question of labor, and it seems that with this type of car the necessity from a repair standpoint for a standard car is decreasing. This is further borne out by the fact that for the 30,000 new cars of this type we have ordered no material for repairs and carry none in stock outside of material common to all cars, except lining; of the lining, our stock amounts to practically nothing. We save out sufficient of the parts from cars destroyed to make up our stock of repair parts, but have found it necessary to use very little of this. There are, of course, many valid reasons why cars should be made to standard inside dimensions and outside clearances.

To look at the matter in another way, the wheels, axles, journal bearings, journal boxes, couplers, brakes, safety appliances, etc., which constitute the removable and perishable parts, are all standard and when it is remembered that nearly all of the remaining parts of the cars are standard rolled shapes which are easily obtained either from the mill or from stock in all principal cities, it is apparent that we now have, in effect, a standard car or at least a car of standard parts. A car of different dimensions would not increase the cost of maintenance as long as standard shapes are used; nor would it if every lot of cars is designed differently, as long as proper strength is maintained, and any change in design would usually be to increase the strength. In other words, to keep a car as close as possible to standard and reduce the cost of maintenance, rolled shapes should be used in preference to pressed shapes where possible.

It is my belief that the people who are urging the adoption of a standard car for maintenance reasons have in mind the remaining wooden cars for the maintenance of which large quantities of timbers and castings have to be kept in stock. It is of vital importance that the parts be standardized if that style of construction were to be continued. It should not be overlooked that in a car constructed with rolled shapes, these parts seldom need renewal, even when the car is wrecked, as they can easily be straightened or formed to the original shape at any car repair point, while wood would have to be replaced and pressed shapes would call for special dies to reform them. With a wooden box car the amount of material necessary to carry in stock and use for repairs increases rapidly with the age of the car, while with a steel frame box car, outside of parts common to all cars, it does not increase.

### WIND RESISTANCE.

The wind resistance on the steel frame box cars with inside sheathing is slightly greater than on a smooth outside sheathed car, but on the other hand, it is less than on any ordinary type of stock car. The difference in the effect of wind resistance between box and stock cars has never been great enough to require any distinction between them as to the number of cars that could be hauled in a train of either, and is really a refinement that not even a dynamometer car can detect. A small change in the angle or velocity of the wind, trucks somewhat out of square, etc., affect the haulage of the train too much to enable any satisfactory figure for the difference in the wind resistance of the various types of cars to be determined. As compared with outside sheathed cars the wind resistance of the inside sheathed, steel frame box car may quite properly be ignored.

### CORRUGATED STEEL LINING.

In the summer of 1911, we lined a steel frame box car with corrugated steel and found it to be as simple a matter as lining with wood. We lapped and riveted the sheets, which were No. 13 gage, between the door and end, and had the corrugations on the side and end coincide, pressing into special corrugated angles in the corners to break the joints. At the floor, we straightened out about 4 in. of the corrugation and formed of it an angle that rests on the side sill, and on this the ends of the floor boards were superimposed, making a very tight joint. After 18 months of general service this car was brought in and on examination found to be in as good shape as when constructed. It was interesting to note that when inspected, the paint sealing the joints where the side sheets lapped was in no place seal broken, indicating that there is no material weaving or deflection of the sides. The paint was in perfect condition, there still being some gloss, indicating that in the use of steel there is no disadvantage as far as the painting is concerned. Different methods of lining with steel could be followed, and I am convinced that if experience proves that there is no damage to be feared from heat, cold or sweating, steel lining will be largely used. But, I am also convinced that the use of steel lining with any insulation will never be extensively used, as it adds to the cost and weight without affording any protection to the lading, which is not secured by the wood lining.

### END CONSTRUCTION.

In the end of the car we use two 4 in. Z-bar end posts of 8.2 lbs. per ft., with 1¾ in. lining, which gives good service, but we intend to use on future cars two 5 in. end posts of 11.6 lbs. per ft., with 2⅜ in. lining for a height of 4 ft. and 1¾ in. lining above. This, we feel, will amply protect any lading. If a car gets such rough handling that wheels, rails or similar lading would break through, it is better to have the boards broken than to distort the posts, as the lining can be replaced at any repair track with a minimum expense, while distorted posts would require sending the car to a steel car repair point. The single thickness end lining makes convenient the application of single thickness, grain-tight end doors.

### SERVICE RESULTS.

Out of 30,000 of these cars, 29 have been destroyed. Based on the length of time in service, this would average a loss of approximately one car per 1,000 per year. Of the cars destroyed 15 were burned and 14 were destroyed in wrecks, 10 cars being destroyed on foreign lines. As the loss of cars by fire is in no way affected by the details of construction, I will eliminate them from the calculations. This then, based on the length of time in service would give about one-half car per 1,000 per year destroyed in wrecks.

A conservative estimate shows that there are now in service approximately 65,000 steel superstructure cars, including those of the outside sheathed type, and of this number 30,000 belong to the Canadian Pacific.

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OPENING A SYRIAN RAILWAY.—The Hedjaz Railway inaugurated the branch line from Haifa to Acca on October 14 by sending a free train to Acca with Haifa people. After the inauguration celebration at the Acca station, the train left with Acca people for Haifa. In the evening a train took the Acca people home and in return brought the Haifa people back from Acca.

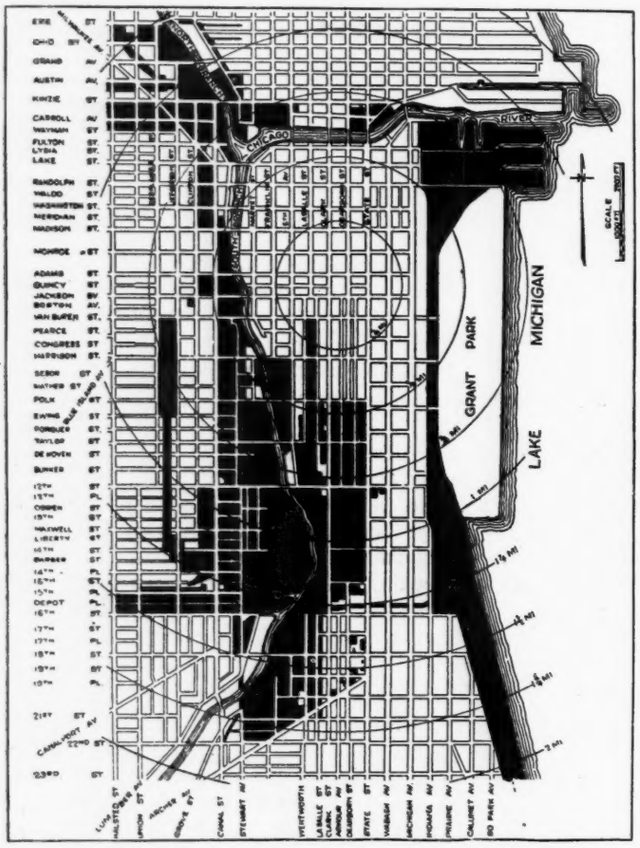
# FUTURE DEVELOPMENT OF CHICAGO TERMINALS.

**Bion J. Arnold Presents Elaborate Report of Comprehensive Study with Recommendations for Reorganization.**

As briefly noted in last week's issue, Bion J. Arnold, consulting engineer, who was retained by a citizens' committee to make a comprehensive study of the railway terminal facilities of Chicago, and to review the report of John F. Wallace, who was retained by the city council committee on railway terminals, submitted his report to the committee on November 18. The report contains 237 pages and some 48 charts and maps.

The following is an outline of some of its salient features as given in Mr. Arnold's summary of his report. An abstract of Mr. Wallace's report was published in the *Railway Age Gazette* of October 24, page 745.

Assuming that none of the present passenger terminals had been constructed, but with the city otherwise as it now is, the best practicable plan for passenger terminals for the city of




**Black Parts Indicate Railway Property in the Chicago District.**

Chicago, that could now be put into effect, on the assumption that all railroad companies would co-operate with the city in carrying it out, would be to have two main terminals, one located on the present site of the Illinois Central station at Twelfth street, and the other west of the river (and in this principle Mr. Wallace and I concur), with these stations supplemented by other smaller stations to the north and south for suburban traffic. This arrangement would eliminate completely all terminals now obstructing the expansion of the business district southward, and parallel this central district on each side with railroad transportation to the maximum extent necessary, and at the same time locate one of the main stations on the west side of the city, which the geographical location of many of the roads demands.

Into this west side station could be run all roads coming from the southwest, west and northwest, upon which roads could also ultimately be established additional outlying larger stations in the same manner that similar stations were established on the north and south roads. The general effect of the outer steam railroad facilities of the city would then tend to enlarge the business district of the city equally in all directions.

In the proper utilization of such an arrangement all of the roads entering the city from the east and south should naturally use the Illinois Central station, while all of those entering from the southwest, west, northwest and north, should naturally use the new station west of the river, unless a connection should be made by means of a tunnel whereby the roads from the northwest, such as the Chicago, Milwaukee & St. Paul and the Chicago & North Western, could be carried eastward under some east and west street, probably Ontario street, and made to connect through a tunnel under the river with the Illinois Central tracks south of Randolph street, thus bringing some of the suburban trains of these roads into the Illinois Central station, while other suburban trains from these roads would run through the west side station to the south and southwest over the tracks of the Pennsylvania and other roads, thus creating an ideal intramural and interurban system of transportation by means of the through-routing features of these stations, and the proper interconnecting of the various railroads of the city.

In these studies the law of probable growth of traffic was determined and it was found that if Chicago maintains the same rate of growth in railroad business as the entire country, within a given period the passenger train movement of Chicago and vicinity is likely to increase as the square of the population of the entire country within the same period, *i. e.*, if the population doubles, the train movement would quadruple. In the same manner it was found that the passenger traffic will likely increase as the cube of the population of the entire country, and applying this measure to the different plans proposed, the remaining life of the present terminals was determined collectively, and likewise the probable life of a single passenger terminal designed to accommodate the passenger traffic of the entire city.

For example: Considering a single union passenger station on the lake front, having 29 stub tracks on two levels, with suitable through connecting tracks, such as the Illinois Central Company's right-of-way at Twelfth street would permit, by the above method, it has been calculated that it would take care of the entire passenger traffic of the city of Chicago, including all the suburban business of the city, for about 7 years, and that, if the suburban business were eliminated from this station, it would take care of all of the main line through traffic of the city for about 28 years. And further that if a similar new station of about the same capacity were constructed at some other point these two stations would take care of the combined passenger traffic of the city for about 32 years, and of the main line through traffic exclusive of suburban for about 50 years. On the assumption that the Chicago & North Western station would take care of its own traffic, these two stations would accommodate all of the through and suburban traffic of the city, except the North Western, for about 40 years, and all through traffic, except suburban traffic, for about 55 years.

Were it deemed advisable to adopt a single station for the city of Chicago, it would seem to me that its logical location would be upon the terminal property of the Illinois Central Railroad at Twelfth street, where ample capacity to the eastward could be obtained for the extension of such a station, and no streets would be obstructed. But the practical difficulties in the way of getting all of the railroads to agree to occupy this station, if it were advocated, and especially those from the west side of the river, most of which logically belong west of the river, coming as they do from western territory, would make this plan impracticable.

In Section 11 it is shown that the location of a passenger terminal for the Pennsylvania Company and its associated roads on Canal street, south of Twelfth street, is not impracticable, and if this company would now see fit to locate at this point, the previously described plan could be at once adopted, and the solution of the passenger terminal problem of the city would be much simplified, because all the other railroads, with the exception of the Chicago & North Western, could then probably be easily induced to finally locate in the new Illinois Central station on the lake front, or with the Pennsylvania Railroad company in its Twelfth street location, and thus make it unnecessary to ever construct any more passenger stations in the business district between Michigan avenue and the river. But, in my judgment, such a location would be unfair to force upon the Pennsylvania company unless other competitive roads and those other roads now having passenger stations north of Twelfth street, agree to join it in a new station or enter the Illinois Central station, for the reasons that such enforcement, would compel the Pennsylvania company to give up its present advantageous location and recede to a point the most distantly located from the business center of all the roads, and be still further handicapped by not only having to cross the river, but also be located in a district now inaccessible.

Furthermore, it is not at all clear to me that the business interests of the city would now be served best if the Pennsylvania and its associated companies now moved their station south of Twelfth street, as this location would unnecessarily inconvenience the many patrons of the present Pennsylvania terminal for some years, with little or no advantage to be gained during the years that it would take to build up the territory between Harrison street and Twelfth street so as to make the Twelfth street site a desirable location.

For these reasons it seems to me that if the Pennsylvania company would agree to locate its passenger station with the headhouse just south of Harrison street, that its interests would be fully conserved, as this location would make its accessibility to the present business district no more advantageous than a Twelfth street location of the other roads would be should they move back, due to the ease with which this Twelfth street location could be reached (if Twelfth street and Canal street are boulevarded) as compared with the hardship of being compelled to cross the river to reach the Harrison street site, something that many of the patrons of the Pennsylvania company must now do and continue to do so long as its station is west of the river. By thus moving back the company would not only get space desirable for the expansion of its passenger station, but would also at the same time be making a concession to the other railroads, which ought to result in their co-operation toward carrying out a terminal plan that should in the end prove satisfactory to the city.

If the Pennsylvania company will not now make this concession to the other roads, and insists upon building at Adams street, it should be required, if allowed to build now, to confine itself to the construction of a station adapted to the location, without crossing the river, which could be used by itself and its associates for some years, and at the same time agree that when the capacity of this station is reached, and at any event within a fixed period of years, unless some method of through routing of main line trains shall have been adopted, to abandon the use of this station for its main line through passenger trains and recede to a new terminal at Twelfth street, west of the river, if it so elects, or, preferably, east of the straightened river, thus avoiding crossing the river at all; *provided*, a co-operative agreement has been reached between the different railroad companies of the city for straightening the river, wherein all roads not naturally belonging west of the river, agreed to recede from the present business district and use either the Illinois Central station, or the new station above suggested, and failing in this, place their passenger stations south of Twelfth street. The Pennsylvania station thus released could then be used exclusively by the Burlington, the Chicago, Milwaukee & St. Paul, the Soo line, the Chicago Great Western, and possibly the western division of the Illinois Central.

If the Adams street plan, as recommended by Mr. Wallace, is now adopted, provided the fundamental conditions herein recommended are agreed to, it will not necessarily prohibit the future development of other stations between Canal street and the river south of Adams street, or on the *co-operative unit* principle in general accordance with the Guenzel and Drummond and Pond and Pond idea. And further if this co-operative unit plan fails entirely of adoption there still remains the opportunity for the development of *individual stations* along Canal street and south of Twelfth street. In the latter case the most logical solution for the Pennsylvania company, if it decides to recede with its main terminal, and such other companies as do not arrange to occupy the Twelfth street station of the Illinois Central Railroad Company, would be for them to build eventually, one or more terminal stations east of the straightened river, and south of Twelfth street.

In case the above plan, involving the use of stub stations or other terminals which would stop all through passenger trains at Twelfth street, should be adopted, there would then be no good reason why the present La Salle street station should not be retained in service and utilized as the suburban terminal of such eastern, southern and southwestern roads as use these Twelfth street terminals for through passenger trains, provided the tracks leading to the La Salle street station were placed under ground and covered north of Twelfth street. It would also be possible to extend two tracks northward under La Salle street, separating around the Board of Trade building, thence through the present La Salle street tunnel to a connection with the east and west subway on Ontario street hereinbefore referred to; thus providing high speed suburban service directly through the center of the entire business district.

Again, while I believe that the Harrison street location would be better for the railroads and the city, I am not so sure that the retention of the present Adams street site by the Union Station Company, and the grouping of its terminal with that of the North Western railway, approached from the east by an opened and possibly widened Monroe street (from La Salle street, west), would prove a detriment, or in reality result in a deterring factor in preventing the other roads from finally voluntarily receding from the business district, for this arrangement would in effect be placing one of the main terminals referred to in my preferred plan at this location though divided into two small terminals. Furthermore, the development of the business district southward, will in time make the Twelfth street location, if Canal street and Twelfth street are widened and boulevarded, so desirable a location for the other roads that they may not consider that the Pennsylvania company then has the advantageous location with reference to the business district that it now seems to have.

Thus, in case of absolute failure on the part of the city to get the roads to co-operate in the construction of union terminals, these roads now having terminals in the center of the business district may, for their own protection, as they need additional passenger facilities, either join the other roads as previously outlined, or construct new terminals south of Twelfth street, for none of these terminals is so located as to warrant reconstruction upon its present site, except for suburban or freight business, the probability of which is treated elsewhere.

### STRAIGHTENING CHICAGO RIVER.

The most important improvement that probably could be made for the benefit of not only the city of Chicago, but also the railroads themselves, would be the straightening of the Chicago river from either Harrison or Van Buren street due north. By this change, drastic as it may seem, the entire congested district south of the present business district, and now occupied by railroad terminals, could be opened up and the freight terminals of the railroad companies rearranged in such a manner as to not only greatly improve conditions for handling freight, but it

would also in time make possible the construction of business blocks upon the sites of the present railway terminals, with the advantages of railroad terminal facilities underneath somewhat on the principle of those now underlying the large district north of the Grand Central Terminal in New York City.

While this class of improvement practically necessitates the electrification of the tracks, the suggestion is not made with the intention of attempting to force such electrification, as most all progressive steam railroad men now recognize that electrification of terminals must come within a reasonable time, and the further reason that this subject is now being analyzed, at the expense of the railroads, by the Committee on Smoke Abatement and Electrification of the Chicago Association of Commerce, whose report is promised for the near future, but only for the purpose of emphasizing the advantages that the railroad companies now possess for future development by the ownership of these sites, which development can ultimately be made, if properly done, without jeopardizing the interests of contiguous private property owners or the interests of the city of Chicago as a whole.

Furthermore, the straightening of the river would transfer from the west to the east side of the river, many acres of comparatively cheap property now lying west of the river, and by this change cause it to double or possibly treble in value, if it were properly developed, for it would then become a part of one of the most desirable localities of the business district. This increase is shown to be from $7,750,000 to $31,290,000, depending upon the location assumed for straightening the river and the relative increase of values assumed. Thus the expense of changing the river would not only be more than fully realized by the railroad companies who now own practically all of the abutting property on both sides of the river, as far as it is herein recommended to be changed, but they would also profit greatly by the change.

### FREIGHT TERMINAL DEVELOPMENT.

With the river thus straightened, it would be possible to so develop and re-arrange the territory both east and west of the river, that the freight capacity and facilities of the railroad companies would be greatly increased, and thus make it possible to handle all the freight business that it is necessary to bring into and take from the business district of the city for many years, so that there would be no accasion now or in the far distant future for the acquirement of additional property for freight facilities in this district. As the business district extends southward these additional freight facilities would be more centrally located than they now are, thus better serving the extended business district as a whole than though this freight were concentrated in the present business district.

From every standpoint, whether the river is straightened or not, the available areas can be developed to such an extent as to make it unnecessary for the Pennsylvania company to develop the proposed new freight area in the manner set forth in its plans. And there is also ample space available for all the freight facilities needed by all of the companies, if they will pool their issues and develop the territory as thoroughly as it is capable of being developed, by using modern and efficient methods.

Chicago freight business consists of two general kinds: (1) through, and (2) Chicago destination or origin. This applies to both carload and less than carload freight.

At the present time inbound freight trains arrive at the various break-up yards located within the city limits where the freight is distributed, and practically one-half of the total inbound freight of the city is sent to connecting lines for forwarding to other points outside of the city, and about 70 per cent. of the half interchanged, or 35 per cent. of the whole, is brought into the downtown district and switched between the various lines, the remaining 30 per cent. of the half interchanged being handled by belt lines outside of the city. Thus about one-half the freight is for Chicago delivery, a large part of which comes into the downtown district to be unloaded and distributed largely from the individual freight houses, or team tracks, of the companies, where those companies only deliver and receive freight for their own companies.

On first thought it would seem that there should not be so many individual freight houses, and that the complete adoption of universal freight houses (*i. e.,* freight houses where freight would be received for all roads and delivered from all roads) would be ideal, but on closer analysis this as yet seems to me to be impracticable and undesirable, and in this respect I do not fully concur with Mr. Wallace who, I judge from his report, appears to recommend that all houses be universal. There is no doubt but that the strong competition between the roads has resulted in the individual freight house idea having been carried to the extreme, but so long as individual road operation is carried on in the city there should be individual operation of freight houses to a certain degree. My conclusions are, that there should be at least one universal freight house in each main division of the city surrounding the downtown business district, and possibly more, but that this is one of the subjects that should require further study.

Summarizing the present situation as regards carload lot freight, there will be established shortly an effective method of handling interchange between 13 of the various roads interested, an improvement which has long been sought for in Chicago. There remain about 11 roads, most of which are interested in the middle belt line, but at the present time there seems to be no operating connection between these two belt line systems, although a physical connection exists at Clearing, and additional facilities, if fully used in a spirit of co-operation upon the Clearing plan, would completely relieve the congestion of the inner city, so far as carload lot interchange freight is concerned. As the city expands there will unquestionably come a time when both belt lines will be required to fulfill the function of this Clearing plan so that one of the principal needs for future investigation is the bringing about of the universal interchange clearing yard or yards for all the roads entering the city, at one or more locations as future business may warrant.

Following the same line of analysis previously described for freight entering Chicago, it is found that about 60 per cent. of the total package freight is interchanged between railroads, either by cars, tunnel or teams, the last named being entirely across the streets of the business district. Thus 52 per cent. of the transfer l. c. l. freight is teamed across the business district. The remaining 40 per cent. of l. c. l. freight inbound is entirely for Chicago delivery at the inbound terminal freight house in the downtown district.

In order to carry out this elimination of the interchange it seems evident to me that some clearing plan must be put into effect similar to that previously described for handling e. c. l. business, but just what plan is best or at what location such clearing yard or yards should be I have been unable to ascertain, within the time at my disposal.

The Chicago Tunnel ought to form a most useful vehicle for package freight handled in the business district, and it is a much more logical railroad freight terminal system than the present system of downtown freight houses operating under intensely congested conditions of team delivery. Furthermore, the terminal charge can be borne by the shipper and reasonably be considered to take the place of the cost of team delivery; whereas the absorption of the terminal charge seems to be a matter of privilege expected by the large shipper, which concession the railroad companies fear they cannot give to Chicago without granting store door delivery in all other large cities or be accused by the government of discrimination in favor of Chicago merchants.

The most useful improvement that can be made is the construction of such a type of freight house as will permit for the same team track capacity a much greater area of street or roadway to permit easier access to the stations. This plan has been developed in the studies herein presented for passenger terminal modifications between Canal street and the river and in connec-

tion with a system of elevated viaducts co-ordinated in levels with the present and proposed bridges; also the double-decking of Canal street through this freight area in such a manner that freight houses located on Canal street will be easily accessible from both levels. All freight houses between Canal street and the river are made available on both sides from a viaduct level, thus doubling the average street capacity for a given sized freight house over that which is normally available with the present type of freight house of single deck construction which are mostly used in Chicago.

PRESENT OCCUPANCY.

In order to fortify myself as to the possibility of further development of present holdings I have had an examination made to determine how well the holdings are used. From this I can only conclude that either the railroads are holding much of this property for strategic purposes, or else they have failed to take advantage of their opportunities to make use of this land. Furthermore, in the various terminal studies it is shown that if the railroads would agree to pool their interests so that each individual holding could be developed to the best possible extent, more freight facilities could be developed on the existing property between the river and Canal street, with the river as now located or as straightened in accordance with my recommendations, than are displaced by the locating of the new passenger station at Adams street, and a much greater capacity available if the passenger station is located at Harrison street and the space occupied by the proposed Adams street station is then utilized for freight purposes.

Thus looking at the freight problem from the most pessimistic viewpoint of the railroad companies as well as from the city's viewpoint, there is no immediate and pressing necessity for granting the Pennsylvania railroad company any permission to cross city streets in order to utilize any additional property for freight terminal purposes. In case, however, such rights are granted they should be granted subject to the conditions set forth, the principal requirements being the complete depression and covering of all tracks and the erection of such buildings upon the property as will not interfere with normal or efficient use of the surrounding streets, or otherwise make the freight houses objectionable to the communities in which they are located. With such conditions and the operation of all trains by electricity there is no good reason why any property now owned by railway companies in any part of the city of Chicago should not be utilized for terminal purposes, provided the air rights are commercially developed to the greatest extent practicable, and the companies are required to pay the same rate of taxation on such property as contiguous privately owned property pays as the revenue from the terminal railroad property improved in this manner should enable the company to carry far more than the increased tax.

My recommendations on this subject are, however, that the question of individual ownership of the property between Canal street and the river must not be considered predominant if these interests are not in harmony with the most efficient plan of development for all parties concerned, including the city of Chicago; and that no authority for the improvement of any of this property be granted, either for freight or passenger terminals, unless the companies submit plans accordingly.

PENNSYLVANIA AND UNION STATION ORDINANCES.

From an analysis of the ordinances asked by the Union Station company it appears that a liberal interpretation would permit far more latitude than was apparently intended in connection with the terminal project. Furthermore, the conclusion cannot be escaped that the city would concede to the railroads much valuable property without receiving commensurate consideration in return therefor. This does not seem equitable in principle or in practice, and a fair consideration of these ordinances should be based upon either an exchange in values or else the equivalent in concessions by both parties to the contract.

Whatever the intent of these ordinances, the concessions asked of the city appear to be so great as to justify a refusal without equal concessions on the part of the railroads, unless further restrictions be determined upon and more definite terms written into the ordinances, in case it is decided to grant them.

The report in its entirety constitutes a comprehensive study of the various factors that enter into the Chicago terminal problem, with a detailed statistical analysis of the population and traffic development of the city and of the various plans that have been presented for the rearrangement of the present terminal facilities.

Mr. Arnold finds that the railways collectively own or occupy more property in the heart of Chicago than is occupied for all public or private business, or an area approximating 26,500,000 sq. ft., half of which represents an equity of $99,375,000. For passenger terminals alone over 1,500,000 sq. ft. of area is occupied, representing at least $15,000,000 realty value. He estimates that the population of the city will probably double in about 34 years, train mileage in about 23 years, railway passenger traffic in about 13 years, and freight traffic in about 11 years.

Of the large stations in the city he says the North Western and the La Salle are alone fitted for future service to any considerable degree, and that the roads should not be called upon or allow themselves to build expensive terminals in which suburban business will soon crowd out the legitimate long distance business for which such terminals are best adapted.

There are now through and suburban trains moving in and out of Chicago during rush hours, handling 34,000 passengers. During the day approximately 1,400 passenger trains move within the terminal district and the passenger traffic aggregates 193,000 a day. An entirely distinct treatment is called for in the handling of Chicago suburban traffic, which does not demand expensive terminals and elaborate appointments, but the quickest possible access to the business district. The defects in the present arrangements are analyzed and the future treatment of suburban traffic is worked out in several alternative plans.

## STEEL UNDERFRAME BOX CARS.*

BY GEORGE W. RINK,

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It is surprising, in view of the interchange of steel underframe box cars among the railroads, that more has not been accomplished during the past five years toward standardization in design of the various component parts, particularly those which affect the cost of maintenance and require constant repairs due to wear and unavoidable accidents.

During the year 1912, there were built 107,887 box cars of various capacities and dimensions, all varying vastly in detail design of important parts which require frequent renewal, thus making it necessary for all railway storehouses to carry an unnecessarily large stock of repair parts running into very large sums of money. Standards have been adopted by the Master Car Builders' Association which have in large measure reduced the amount of stock necessary to carry. I believe the time has arrived to introduce additional standards affecting the maintenance of box cars which can also be applied to all types of freight cars used in interstate business.

It is reasonable to assume that every railroad manager desires to purchase cars built in a substantial manner. In the absence of standard construction and because of competition, the car builders, when asked to furnish estimates and designs, will sometimes figure on material too light for the service. This, however, is not the fault of the car builder, since, from my own experience, I know that they will gladly add the material where needed, provided they are paid a fair price for the car.

From my observation of steel underframe box cars, I must conclude that engineers did not understand the importance of low fiber stresses in the early designs of steel underframes;

*Extracts from a paper read before the American Society of Mechanical Engineers at the annual meeting, December 3, 1913.

sufficient attention was not given to the tremendous impact blow which the center sills and car framing have to resist, with the result that large sums of money are now being spent by railroads in making repairs to these cars by reinforcing broken center and draft sills, applying larger capacity draw gears and attachments, and heavier sills. It is not alone the larger locomotives we are using today which has called for a more thorough investigation of the subject of car design and construction, but also the severe shocks which cars are receiving in classification yards. Also the superstructure of box cars should receive just as much attention as the underframe, for how can the roofs be kept in alinement on cars having wood side posts and braces and loose tie rods? The roof is bound to work loose, resulting in leaks which prevent the use of the car for certain commodities.

The application of steel center sills to old cars will no doubt prolong their life. This is now being done by almost every railroad on cars built just prior to the advent of all-steel underframe box cars, but care should be taken to see that sufficient metal is provided to withstand the present service requirements, keeping in view a margin of safety for the future, as no doubt it would be desirable to maintain in service for at least ten years cars to which these steel center sills are applied.

Railway officials in charge of car repairs have seen the results of poor designing and light construction of the earlier steel underframe cars, and during the past three years have materially assisted in the development of the art by insisting upon the production of a stronger car, one that will hold together in all kinds of service with the minimum cost for repairs.

The strains which an underframe has to withstand vary, and depend a great deal on the design and arrangement of the body bolsters, side sills and body framing. With substantial side sills and body bolsters, compressive strains can be transmitted by the latter and thus part of the compressive load can be taken care of by the side sills. However, there is a limit to the load the side sills can take care of which is based on the ratio of length to the least radius of gyration, the length being considered as the maximum distance between adjacent floor beams. In the case of cars with wood body side framing it would appear desirable to provide sufficient area at the smallest section of the center sills to take care of end strains, allowing the side sill to carry only its proportion of the vertical loads due to lading, weight of superstructure and an allowance for vibration.

In the case of box cars with steel side frames there is no question about the ability of the frame structure to carry considerably greater loads, both vertically and due to end shock, on account of the diagonal braces assisting in transmitting the strain throughout the side. For this reason some designers do not consider it necessary to use continuous cover plates on the center sills, but use rolled steel sections for these sills, having a much smaller net area than what is considered good practice by others.

In order to properly analyze the stresses in underframes a standard method of comparison should be made. Cars do not fail as a rule because of the weight of lading, but principally because of strains transmitted through the coupler. The magnitude of the end shocks that underframes have to withstand was investigated in tests conducted prior to 1902, on the Lake Shore & Michigan Southern with a dynamometer car having a capacity of 300,000 lbs. It was found that the tensile and buffing strains, with an engine having a tractive effort of 36,000 lbs., were from 50,000 to 70,000 lbs., and 80,000 to 150,000 lbs. respectively, depending upon the skill of the engineer in manipulating the engine, the train remaining intact. In coupling an engine to its train, buffing strains from 65,000 to 142,000 lbs. were obtained. Thirty cars moving at about 6½ miles an hour, and coupling to ten loaded cars with brakes set, gave a shock of 376,492 lbs. It would appear from the above results that provisions should be made in designing a steel underframe box car to take care of an impact blow of 350,000 lbs. transmitted throughout all sills. It would therefore seem advisable to assume an end strain of 200,000 lbs. on the center sills of box cars with steel side frames and 300,000 lbs. for box cars with wood side frames for the reasons previously mentioned.

Where structural steel channels are used for center sills, the practice is to extend them to the end sill to serve as draft sills. It has been customary when fish-belly type center sills are used, to provide pressed steel Z-shape draft sills and splice them to the center sill web plates projecting through the bolster. There is a tendency on the part of designers today to do away with the splice by extending the web plates of center sills and providing outside angles to form the draft sill using a continuous cover plate. Where pressed steel center sills and cover plates are used, the practice has been followed of extending this construction to the end sill, bringing the cover plate too near the end of the sill. This construction requires the use of web plates about 5/16 in. thick, so as to provide sufficient bearing area for draft lug rivets. I believe that when draft sills have sufficient net area behind the bolster stop, considerations of economical construction would warrant dispensing with the splice, as in view of the additional cost of a splice on 1,000 cars, the expense of its application is not warranted when considering the number of sill failures likely to occur due to its omission.

The impact blow resulting from cars coming together is practically absorbed by the draft gear. Friction gears are more efficient in this respect, absorbing a much greater percentage of total energy than spring gears. Owing to the large variety of gears in service, necessitating numerous designs of draft lugs, key attachments, etc., it would appear that, if a standard arrangement of draft gear and all appliances connected therewith were adopted by all railroads, it would result in great economy of maintenance. This should include striking plates and carry irons, which on a large number of cars are not of sufficient strength, due to the arrangement of the end sills.

It is surprising that more has not been done in the way of standard construction of box cars. The large expenses which railroads are now compelled to face, due to repairs to freight cars, could be partially reduced if standard designs were in use throughout the country. Repairs would be facilitated, due to the use of standard materials throughout for various types of cars, fewer cars would be held up at car repair shops awaiting material from foreign roads, and interchange of cars would not be a hardship to any railroad, as all cars would be of equal strength. Also drawing room expenses would be reduced both for the railroad and car builder, and repair parts could be produced by cheaper methods than those followed at present, due to the elimination of a variety of designs and shapes, principally castings and pressed steel parts.

## SEAMS IN RAILS.

There has been much discussion of the effects of seams in the base of rails during the past two years. Bulletin No. 160 of the American Railway Engineering Association for October, 1913, contains two papers on this subject by H. B. MacFarland, engineer of tests of the Santa Fe, and M. H. Wickhorst, engineer of tests of the rail committee of this association.

The first paper discusses the influence of seams or laminations in the base of rail on the ductility of metal. In a previous paper by Mr. MacFarland, it was shown that the influence of seams or laminations in the base of rails was a most important factor in the failure of rails. This later paper contains a study of six failed rails which had been sent to the laboratory for test. These rails were of 75, 85 and 90 lb. weights; of A. S. C. E., A. R. A. and Santa Fe sections, and rolled by four different manufacturers. This selection was made to secure specimens with dissimilar failures to determine whether or not seams and laminations such as are found in the base of rails failing with characteristic half-moon base failures and with square and angular breaks could be traced through all rails. The specimens were submitted to careful and extensive

tests as a result of which the following general conclusions were drawn:

Rails failing in track may generally be found, upon investigation, to contain numerous black seams in the base.

Base seams are not continuous throughout a rail and vary in depth at different intervals.

Seams materially decrease tensile properties of the metal in the rail base.

Seams decrease strength of rail bases for decreased temperatures.

Transverse strength of rail base is decreased about 10 per cent., due to seams in the base.

The seams in the rail base may be periodical, due to methods of manufacture causing variation in tensile properties at different portions of the rail.

To reduce rail breakage efforts have been made to increase the rail section, when probably the decreased strength of the rail is due more to physical defects contained therein, than to the weight of the sections. More attention should be given to the elimination of base seams and the direct production of a rail with a uniform homogeneous structure.

The second paper covers a study of the development of seams in billets and rails from cracks in the surface of the ingot. From a pile of cold ingots, one was selected with a badly marked surface, and its four sides were "skinned" off in a planer to show clearly the condition of the surface. Photographs were made of these surfaces and of the blooms and rails at various stages of rolling.

This experiment showed that the cracks in the ingot were, in a general way, transverse or obliquely transverse of the ingot. When first bloomed, the cracks on the right and left sides of the ingot as it first entered the blooming rolls, opened up or "yawned" open, forming double V's, one inside the other. Further blooming elongated and closed in the cracks, forming them into elongated Y-shaped flaws, or clusters of them. Still further rolling finally resulted in long narrow Y-shaped seams in the rail, or clusters of them, generally several feet long, as shown up by pickling in sulphuric acid.

The cracks on the top and bottom sides of the ingot as it first entered the rolls, did not open up and finally disappeared so far as could be determined by the appearance of the surfaces of the blooms and rails after pickling in sulphuric acid.

The difference in behavior of the cracks on the top and bottom sides in rolling from the behavior of those on the right and left sides suggests the interesting conclusion that the metal ahead of the rolls is compressed, while that between the rolls is pulled.

The work indicated that seams resulting from cracks in the ingot will be on the web of the rail if what were the right and left sides of the ingot as it first entered the rolls form the sides of the rail, and that they will be on the top of the head and the bottom of the base if these sides of the ingot form the tread and base of the rail.

The cracks on the right and left sides of the ingot as it first entered the blooming rolls, resulted in seams in the rails, while the cracks on the top and bottom sides of the ingot did not result in seams. Seams may therefore possibly be oriented to appear on the sides of the rail or on the tread and the bottom of the base.

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PASSENGER CARS IN SWEDEN.—There appears to have been considerable development in the Swedish coach in recent years. The new models are much longer and heavier than the old 4-wheeled type, and the swiveled truck is coming into general use. The compartment prevails, but a corridor is run along the inside of the coach, at one side. Sleeping cars are arranged in the same way. Vestibuled coaches are run through from the continent, but can not be said to be in general use in Sweden. Gas is generally used for lighting and steam for heating in the better class of equipment.

## PROPER LOADING OF COAL CARS.

The St. Louis & San Francisco has issued circular No. 39 giving instructions for loading coal on coal cars. With lump and run of mine coal extending above the sides of open cars the lumps must be beveled up to a crown not over 26 in. above the sides on steel coal cars, and not over 20 in. above the sides on wooden cars. The accompanying illustrations show the proper and improper methods of loading cars as shown in the circular. The load on the properly loaded car weighed 107,500 lbs., while the load on the improperly loaded one weighed only 99,000 lbs., making a difference of 8,500


**Properly Loaded 50-Ton Gondola Car; Net Weight, 107,500 lbs.**

lbs., indicating that 92.09 properly loaded cars would haul as much as 100 improperly loaded cars. On the Frisco system there was an average of 442.95 cars loaded per mine working day during the fiscal year ending June, 1913. If they had been loaded properly there would have been a daily increase in the available car supply of 38.05 cars, which is surely worth consideration.

The proper loading of cars would not only decrease the car shortage, and thereby assist both the shippers and the railroad company, but would also increase the average number of tons per loaded coal car mile and decrease the shipper's


**Improperly Loaded 50-Ton Gondola Car; Net Weight, 99,000 lbs.**

cost of transportation. The tariff provides that the minimum freight charge on coal shall be the stenciled capacity of the car, and when the shipper does not load with sufficient care to meet this minimum weight he will be paying more than if the car had been loaded properly. When presented in this light the shippers have been eager to conform to the requirements of the circular. It has been found that no extra time per ton loaded has been required to load the cars in the proper manner, and that the losses in transit due to the coal falling off the car have been materially reduced.

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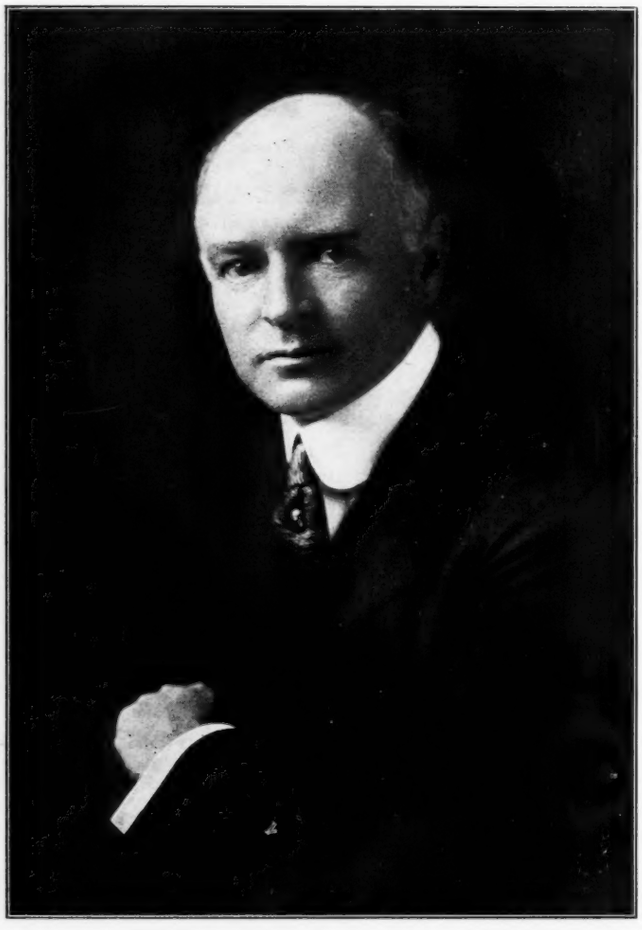
THE RAILWAYS OF QUEENSLAND.—The Queensland government railways have been designed mainly on the following plan. There are three principal lines running west and southwest from the coast; from Brisbane on the south to Cunnamulla (2,184 miles); from Rockhampton in the center to Longreach (972 miles); and from Townsville in the north to Winton and Cloncurry (792 miles). Five other lines open up the interior from the ports of Bowen, Cooktown, Cairns, Mackay and Normanton. Two other important lines are at present under construction.

## FAIRFAX HARRISON.

Fairfax Harrison, president of the Chicago, Indianapolis & Louisville, was on December 1 elected president of the Southern Railway, the Alabama Great Southern, the Mobile & Ohio and the Virginia & Southwestern, succeeding W. W. Finley, deceased. On the occasion of Mr. Harrison's election the directors of the Southern made public the following statement:

"Mr. Harrison was one of Mr. Finley's closest and most trusted advisers, and is thoroughly in sympathy with the policies which made Mr. Finley's administration so successful both for the Southern Railway Company and the territory served by its lines. Though Mr. Harrison entered the service of the Southern in the legal department, his experience has not been confined to that branch of the service. He has given much study to financial, traffic and operating problems and is intimately acquainted with conditions on the Southern Railway and throughout the section which it traverses. As president of the Chicago, Indianapolis & Louisville he was actively in charge of the operation of the railway, so that he comes to the Southern Railway prepared by practical experience as well as the most detailed knowledge of the details of its affairs to take up the duties of the chief executive."



Fairfax Harrison.

Mr. Harrison's rise has been almost unique among those of the presidents of large railway systems. Most of the presidents have risen through the operating or traffic department. Mr. Harrison came up through the law and the financial and accounting departments. His advance has been as rapid as the channel through which he has risen has been different from that through which most railway men have risen. He becomes the president of a great railway system when but 43 years old, and after having been connected with the railway business only 17 years.

Railway presidents are not made by accident in this country. When, therefore, a man has come up as Mr. Harrison has there are pretty sure to be good reasons for it. The reasons in Mr. Harrison's case are to be found in the conditions which have developed on the railways of this country within recent years and Mr. Harrison's personal qualities. The railway conditions referred to are those which have made it necessary for a successful railway executive to be not only an expert in the operating sense, but also a railway statesman. He must be able to deal with public sentiment and public officials diplomatically. He must be able to see and accept the good that there is in proposals for the regulation of railways and to oppose skilfully and effectively the things that are bad in such proposals. He must have a broad and deep understanding of economic and social problems in order that he may further good relations between the railway on the one hand, and its employees on the other, and thereby promote the economic welfare of the railway and the safety of its operations. Mr. Harrison's studies, his training, his experience, and his natural qualities of mind and character have equipped him to grasp and deal with these big problems in a broad and comprehensive way.

His father was Burton Harrison, secretary to Jefferson Davis, President of the Confederate States. His mother is Mrs. Burton Harrison, famous as a writer. His brother, former Congressman Francis Burton Harrison, is now Governor-General of the Philippine Islands. Reared in an atmosphere at once political and literary, Mr. Harrison is one of the most highly educated, widely read, and, in the best sense of the word, scholarly men not only in the railway world, but in any other business in the United States. His writings on railway and other subjects show that if he had chosen a literary career he might have been one of the greatest of American stylists, and that if he had devoted himself to economics he might have been a leading political economist. Having instead entered railway service, he already, although still a young man, has done work that has put him in the forefront among those who have been striving to promote the best interests of the railways of the United States. As the statement above quoted indicates he was one of the closest and most trusted advisers of W. W. Finley when Mr. Finley was doing his wonderful work of re-establishing good relations between the railways and the public in the South and to put the Southern Railway on a sound operating and financial basis. He served as chairman of the Car Service Commission of the American Railway Association and did constructive work in that capacity, which promises to be in time very fruitful and which already has yielded good results. He was serving as a member of the board that had been arbitrating the controversy between the Burlington and its conductors and trainmen when he was elected president of the Southern. He has made a number of addresses on railway subjects within recent years, every one of which has been notable for its broad, comprehensive views and its beautiful English.

Mr. Harrison was born March 13, 1869, in New York City. He was graduated from Yale University, with degree of A.B., in 1890; from Columbia University, with degree of A.M., in 1891, and was admitted to the bar in New York in 1892. He then practiced law in the office of Bangs, Stetson, Tracy & McVeagh, New York, until 1896, when he began railway work as solicitor for the Southern Railway. In 1903, in addition to his duties as solicitor, which title he retained during his connection with the Southern at this time, he was made assistant to President Spencer. He was chosen vice-president in 1906, being in charge of the financial and accounting departments, resigning in August, 1910, to become president of the Chicago, Indianapolis & Louisville. Mr. Harrison is a member of the Permanent Commission of the International Railway Congress, and probably has done more than any railway man in the United States to make the meetings of the congress successful.

# General News.

The Grand Trunk shops at Port Huron, Mich., were destroyed by fire on November 26; loss many hundred thousand dollars.

In the Federal Court at Charleston, W. Va., November 25, the Coal & Coke Railway was fined $600 for violation of the safety appliance law.

The Denver & Rio Grande has put in service a telephone train despatching system between Salt Lake City and Rio Grande Junction, a distance of 261 miles.

The House Committee on Territories is said to have agreed upon a bill, to be soon presented in Congress, for the construction of railroads by the government in Alaska.

The Pennsylvania Railroad suspended several hundred employees at the Altoona shops on Tuesday of this week and reduced the time in most of the shops from 55 or 60 hours a week to 40 hours a week.

H. E. Montague, traveling passenger agent of the Southern Pacific, was shot and killed, near Los Angeles, on the evening of December 1, while trying to disarm a highwayman who was endeavoring to rob passengers on westbound train No. 9.

On the occasion of the funeral of the late W. W. Finley, president of the Southern Railway, all trains on that company's lines were stopped for five minutes, and all work in the offices and shops was suspended for the same length of time.

W. A. Harriman, son of the late E. H. Harriman, and a director of several railways, has gone to work in the shops of the Union Pacific at Omaha. It is reported he will be given a general experience in various capacities in the shops and offices to learn something of the detail work.

The National Association of Railway Commissioners has appointed five special committees on valuation to represent the state commissions in the five districts into which the country has been divided for the purpose of making the federal valuation of railway property.

A press despatch from Ottawa says that a Board of Conciliation, appointed under the Industrial Disputes Act has settled a controversy between the Grand Trunk Railway and its station and telegraph employees, to the number of 1,300, awarding increases in wages estimated to amount to $200,000 annually. The decision of the board was unanimous.

In the United States District Court at Boston suit has been begun against the Boston & Maine for a large number of violations of the hours of service law. At Buffalo suit has been begun against the Grand Trunk for violation of the law regulating the number of hours that animals may be kept in cars without food or water. The charges have to do with shipments of cattle from Detroit and other points in Michigan, destined to Buffalo.

W. C. Nixon, receiver and chief operating officer of the Frisco, has announced a plan for the appointment of one additional assistant superintendent on each division of the Frisco. The principal duties of the assistant superintendents will be to supervise stations and correct any conditions which may discommode the public; they will also be vested with authority to rectify any defects or improper practice which they may observe. Ample evidence has been given that Mr. Nixon's plan of vesting the agents with more authority in dealing with the public is appreciated, and this plan is a further effort of the management to accommodate and safeguard the patrons.

On the night of November 25 a special train consisting of a locomotive and two cars was run from Washington, D. C., to Jersey City, N. J., 226 miles, in four hours, the fastest trip ever made between the two cities. The route was over the Baltimore & Ohio, the Philadelphia & Reading and the Central of New Jersey. The train was run for a New York newspaper, to carry photographs taken at the marriage of the President's daughter. Enlargements of the pictures were made before leaving Washington, and some of the development work was done on the train. The train left Washington at 8:10 p. m., and arrived at Jersey City at 12:10 a. m. The best previous run between these cities, of which we find record, was 4 hours 11 minutes, over the Pennsylvania.

Attorney General Lucey of Illinois has refused several requests for an opinion as to whether the anti-discrimination clause of the new public utilities law which goes into effect on January 1 prohibits passes. The act provides "that no public utility or any officer or agent thereof, or any person acting for or employed by it, shall, directly or indirectly, by any device or means whatsoever, suffer or permit any corporation or person to obtain any service, commodity or product at less than the rate or other charge then established and in force as shown by the schedules filed and in effect at the time." It is not generally believed that the legislature intended to make passes illegal, because it defeated an anti-pass bill. Most of the railways are planning to act on the supposition that the clause prohibits passes except to railway employees.

According to press reports the Sumpter Valley has recently settled a strike of its trainmen by awarding an increase in pay to its enginemen. After a brief strike of the trainmen the enginemen and firemen also presented demands on the company President D. C. Eccles insisted on separate negotiations with the two organizations, and gave the enginemen and firemen an advance in pay and changes in working conditions, securing an agreement on their part not to strike. Then he met the trainmen and declined to reinstate five men who had been discharged during the strike, or to advance wages. The men threatened to strike, but after deciding that such a move would be futile without the enginemen and firemen, were persuaded to accept an agreement which included some changes in working conditions and an anti-strike clause.

"Railophone" is the name of an induction apparatus suitable for a cab signal or an automatic train stop which is being installed for experimental use on the Midland Railway of England at Derby. Signaling points will be arranged in connection with two distant signals. The roadside conductor is contained in a cable, laid underground alongside of the railroad, and the coil of wire carried on the engine is arranged in the form of a frame which is supported by the underframe of the engine, running clear around. A current in the roadside conductor induces a current on the engine and this current holds closed an electro magnet, which, when de-energized, gives a warning signal or opens a valve to apply the power brakes, as may be desired. Separate roadside currents, one to act on westbound trains and the other to act on eastbound, are said to have been worked successfully.

### Conference on Southern Pacific Labor Controversy.

A conference between the officers of the Sunset Lines of the Southern Pacific and the national officers and general committeemen of the four brotherhoods who recently went on strike, was begun at Houston, Tex., on November 24 for consideration of the list of 67 grievances presented by the brotherhoods for adjustment, in accordance with the conditions of the agreement consummated through the federal board of mediation and conciliation. The grievances were taken up one at a time and documentary or oral testimony was presented for each case. It was expected the conference would require ten days to two weeks.

### New York Central Safety Meeting.

A New York Central "Safety First" meeting was held in the auditorium of the Engineering Societies' Building, Thirty-ninth street, New York, on Monday evening last. F. V. Whiting, general claims attorney of the New York Central, acted as chairman. In the absence of Vice-President A. T. Hardin an address was read by F. W. Brazier, superintendent of rolling stock, after which M. A. Dow, general safety agent of the New York Central Lines, delivered an illustrated address. Miles Bronson, general superintendent of the Electric Division, followed with a short talk, and five-minute talks were given by James Covington, conductor; Graham Gray, engineer, and Fred Ferguson, trainman, all New York Central employees. Emphasis was laid by all the speakers on the great necessity of personal care and thought on the part of railway men in order to secure safety. Mr. Bronson laid stress on the subject of dis-

cipline, stating that while it was often considered a hardship by the men, it is absolutely necessary to the safe conduct of a railroad.

### A Warning.

Since the railroads in Mexico were nationalized freight rates have advanced 25 to 50 per cent. and the physical properties—aside from the damage inflicted by the civil war—have greatly deteriorated. Perhaps there is a warning for this to the shippers of this country, for we are drifting fast toward the nationalizing of our own railroads. All state railroads of Europe and in the antipodes have advanced their freight rates, and it is apparently much easier for a government railroad to advance its rates than for a railroad under private ownership.—*Manufacturers' News.*

### "Safety First" on the Pennsylvania.

The "Safety First" Committee of the New York division of the Pennsylvania Railroad, J. O. Young, chairman, held a meeting at Jersey City on the evening of November 25, about a thousand employees being present. Short addresses were made, not only by Chairman Young, but also by Superintendent J. B. Fisher and by Engineman H. J. Fackenthall. Besides the usual addresses and stereopticon pictures, two series of motion pictures were given, one entitled "The Usurers' Grip," showing the unfortunate condition of the man who borrows money at exorbitant rates, and the other entitled "A Workman's Lesson," designed to show the distress resulting when a shopman refuses or neglects to use means provided in his shop for safety, and suffers bodily injuries because of his mistaken course.

### President Favors Alaskan Railroad Project.

The proposals that the government shall build railroads in Alaska, which have been before Congress for some months back, receive a general endorsement from President Wilson. In his annual message, delivered this week, he says: "A duty faces us with regard to Alaska which seems to me very pressing and very imperative. The people of Alaska should be given the full territorial form of government, and Alaska, as a storehouse, should be unlocked. One key to it is a system of railways. These the government should itself build and administer, and the ports and terminals it should itself control in the interest of all who wish to use them for the service and development of the country and its people."

### A Federal Employers' Liability Law.

We owe it, in mere justice to the railway employees of the country, to provide for them a fair and effective employers' liability act; and a law that we can stand by in this matter will be no less to the advantage of those who administer the railroads of the country than to the advantage of those whom they employ. The experience of a large number of the states abundantly proves that.—*President Wilson.*

### Sir William Van Horne's Views.

You all know that the railways of the United States have for a long time been under attack. At every session of the legislature new laws are levelled against them. The public has supported these laws without giving them much thought, and today the railways of the United States are struggling almost for their very existence, many of them standing on the very edge of bankruptcy.

I am quite unable to account for the spirit of hostility against the railways there, for the service of the railways of the United States is—envied only Canada—the best in the world; their rates are much lower than any other country in the world save Canada; there is greater regard for public interest and the safety of the individual than in any other country in the world—always save Canada. This precarious situation is the great cloud overshadowing business conditions in North America today.

We have seen in recent years such things as the New York Central being compelled because of the false statement of an employee who swore he couldn't see a certain red light to spend fifty or sixty millions in completely changing their New York terminals. We have seen the New York, New Haven & Hartford hounded by ignorant public opinion, to the very verge of bankruptcy.

Now all these things are catching, and sometimes Canada has shown a tendency to follow suit. I will only cite one instance, and that is the legislation which ten years ago wiped out the small independent local elevator system, with the result that western farmers are getting less for their wheat than ever before.—*Sir William Van Horne: Speech at Toronto.*

### A Lunch Counter Car on the Pennsylvania.

The greatest annoyance on many heavy express trains is the inability of the dining car to serve all passengers in good season, and the necessity of standing in the narrow passage way while preceding diners finish their leisurely meal. The disposition on the part of some passengers to take their time at the dinner table, notwithstanding the fact that other hungry people stand glaring at them, should perhaps be included as a part of the cause of this difficulty. The Pennsylvania has undertaken a very interesting experiment looking to the abatement of this nuisance. It has built a lunch counter car and is running it experimentally on trains which also have regular dining cars. The new car has just been finished and has been put in service between New York and Philadelphia. While the novelty of the counter car may for a few days prevent a fair comparison in the patronage of the two kinds of cars, it is planned to continue the experiment for a sufficient period to determine just which is the more popular with the traveling public; to see whether a plan by which meals can be served in less time will be satisfactory. The car is 80 ft. long. Instead of tables there is one long mahogany counter extending over half the length of the car; facing this counter on one side are revolving chairs, secured to the floor. The counter is long enough for 21 people to be seated at one time. Back of the counter against the wall there are twenty cupboards for supplies, in addition to receptacles for crushed ice, drinking water, ice cream, milk and cream. Shelves for linen and silver occupy the space under the counter. Sunk in the counter at the end farthest from the kitchen is a cigar humidor. At one end of the car there is a wash basin for the use of passengers. The pantry and kitchen are at one end of the counter. The pantry contains dish racks, cupboard, a sink and a locker. Food will be passed from the kitchen into the pantry through openings which can be closed by sliding doors. As these openings are just above the serving table in the pantry, there is no necessity for waiters to go into the kitchen. The kitchen itself is about 11 ft. long; it contains a range, broilers, steam table, ice box, coffee urn, soup receptacle and meat warmer. The car is in service on a train leaving Philadelphia for New York at 12 o'clock noon, and on the train leaving New York for Philadelphia at 6 p. m.

### Rules for Distributing Cars in Texas.

O. C. Castle, car service agent of the Sunset-Central Lines of the Southern Pacific, has issued to agents a circular containing a brief of a statute passed by the Texas legislature as recently amended, prescribing rules for the distribution of freight cars. The circular also gives instructions to agents as to the method of handling orders for cars under this act.

By this it is made the duty of railroads to furnish cars on written application by prospective shippers at such points as are indicated in the application within a reasonable time, such cars to be supplied to persons so applying therefor in the order in which such applications are made, without giving preference to any person.

The time allowed for filling such orders is as follows:

| | |
|---|---|
| 12 cars or less | 3 days |
| More than 12 cars and less than 50 | 6 days |
| 50 cars or more | 10 days |

The act also provides that applications should state the number of cars and the place and the time they are desired.

If cars applied for under this act are not furnished, the railroad shall be liable to shipper for $25 per day for each car failed to be furnished, plus all actual damages sustained by applicant.

Applicant shall deposit with agent, or other representative, at the point the cars are desired, with whom the order is filed, one-fourth of the amount of freight charges for the use of such cars.

Cars shall be fully loaded by shipper within 48 hours after cars are placed; on failure to load within 48 hours, shipper shall pay the railroad company $25 for such cars not so loaded; provided that when cars placed on orders placed on several days are "bunched" and delivered on the same day, the applicant shall have 48 hours for each car or lot of cars so delivered. In case applicant shall not use the cars ordered he shall pay, in addition to the penalty of $25 per car, actual damages sustained by the railroad company through his failure to use such cars.

When cars have been supplied and loaded, the railroad company shall deliver to consignees within a reasonable time.

Consignees shall unload within 48 hours after delivery and notice, or forfeit to the railroad company $25 per day for each car not so unloaded.

Parties bringing suit against the railroad company under this law shall be required to show by evidence that cars, if furnished, would have been loaded within the time specified by this act.

It is also provided that none of the provisions of this act shall forfeit or annul the demurrage regulations provided by the railroad commission, and all penalties accruing to the carrier thereunder shall be cumulative of and in addition to all demurrage charges prescribed by such commission.

### Threatens Receivership Because Refused Passes.

An interesting alleged correspondence between Chester M. Dawes, general counsel of the Chicago, Burlington & Quincy, and State Senator John T. Denvir, of Chicago, in which the road was threatened with receivership because of the refusal to issue free transportation, was the subject of a hearing at Chicago on November 19, before Examiner Gutheim of the Interstate Commerce Commission.

The correspondence introduced at the hearing began with a letter to Mr. Dawes under date of January 11, 1913, signed with Mr. Denvir's name and written on the stationery of the Illinois legislative public utilities commission, of which Denvir is a member, asking if it would be compatible "to furnish me with annual transportation over your lines for 1913, on account of legislative public utilities commission." To this Mr. Dawes replied: "I regret to say that I will be unable to grant your request for pass over our lines for the ensuing year. This company issues no free transportation, state or interstate, and I can make no exception to the rule."

The third letter, addressed to Mr. Dawes on January 18, and signed with Mr. Denvir's name, included the following: "As chairman of the public utilities commission you can look for legislation that will work hardship on your company, and I wish to assure you that when our commission gets through with you that you will find your road in the hands of a receiver, for you certainly are violating the laws of the state in a great many respects, and we know it, but have gone along and been friendly to you; but inasmuch as you are inclined to be so diplomatic in your statement that you would not 'like to violate the custom you have indulged in,' I feel inclined to think that a little resolution with respect to a committee for a thorough investigation of your gross negligence with regard to your methods of procedure will be well to adopt at the next meeting of the senate. Hoping that you can see fit to favor our commission's request, I am, as ever, faithfully yours."

To this Mr. Dawes replied: "I shall carefully preserve your letter for such future reference as shall be desirable, and am glad to be advised of the methods which control the attitude of an important public servant." The correspondence also included a letter from President Miller to Mr. Dawes, stating that it seemed advisable to make a special file of requests of this kind.

M. Denvir testified at the hearing that he had not written the letters in question, and explained them on the ground of forgery or a joke. He did not explain, however, how Mr. Dawes' reply to his first letter, which was addressed to Mr. Denvir at his home, got into the hands of the alleged jokers to form the basis for the second letter signed with his name.

It is understood that the Interstate Commerce Commission has been collecting evidence, by examining the railway pass records in Illinois during the past year, as the basis for a report on the extent to which passes have been issued to politicians and others. This is a part of a general investigation now being undertaken by the commission.

### American Railway Association Meeting at Chicago.

An adjourned meeting of the American Railway Association was held at the Blackstone, Chicago, on Wednesday last, 235 members being represented by 135 delegates. The report of the committee on relations between railroads, action upon which was postponed at the regular meeting last month was again presented. On the recommendation of the committee the following resolution was adopted:

Resolved, That members of the association be requested to report monthly on form C. E. 8 the location of their box cars on foreign lines and of foreign box cars on their lines, these reports to cover all box cars, including ventilated box cars and box cars for furniture and automobiles, excluding only refrigerator cars. (Refrigerator cars are defined as box cars with complete insulation and ice boxes.)

On the recommendation of the committee the association directed that a letter ballot be taken on the question of amending per diem rule 5, with the provision that if a new form is adopted it shall go into effect on January 1, 1914, the date on which the present per diem rule 5 is to be cancelled. The proposed rule is as follows:

"An arbitrary amount for each car in switching service may be reclaimed by each individual switching line from the roads for which the service was performed. This amount shall be based upon the average number of days, *not to exceed* 5, *actually required in such switching service, to be determined annually by an examination of the records of each individual switching line by the roads directly interested for each local territory.*

*"No reclaim shall be allowed for an intermediate switching movement. No reclaim shall be allowed under this rule to a non-subscriber."*

On recommendation of the committee per diem rule 6 was amended and two new definitions in connection therewith, covering a subscriber and a non-subscriber road, were adopted and ordered to a letter ballot.

The committee recommended that the standard interchange form be printed on light pink paper when used for deliveries, and on light yellow paper when used for cars received. The committee also reported a new form of junction report to be substituted for the present form D-1; and this was adopted by the association.

The association decided to eliminate per diem rule 18 and the corresponding explanation to demurrage rule 2-D-1 and adopted a new explanation in connection with demurrage rule 5, section A, which is believed will operate more fairly to shippers and carriers than the former arrangement.

The following interpretations of car service rules 10 and 15 were also adopted:

Question—Does rule 10 apply when a car is detained at destination because of refusal by consignee due to delay or damage in transit by accident or other causes?

Answer—No.

Question—Under rule 15, in the absence of a local agreement, should an extra percentage be added to cost for supervision?

Answer—Ten per cent. should be added to the actual cost.

New car service rule 17, in regard to the proper marking of private freight cars, and payments therefor, was adopted.

The committee reported that the General Managers' Association of Texas had held a conference with the committee through its chairman, and that it is probable that supervisors of demurrage will be appointed for that territory.

The following interpretation of section B, rule 1 of the demurrage rules, was adopted:

Question—Does section B, rule 1, apply to cars placed for loading coke or to such cars loaded with coke at bi-product ovens or gas retorts which are not adjuncts to mines?

Answer—No.

On the recommendation of the committee the language of the national demurrage rules was amended to conform to that of the uniform bill of lading, providing that notice be "sent or given."

The association also approved the recommendation that the

explanation to rule 3, section B, of the demurrage rules be made a section of the rule itself.

A standard form of agreement covering notice by telephone under the demurrage rules was adopted.

### Dinner to Mr. Mellen.

At the dinner which was given at Boston last Sunday in honor of Charles S. Mellen, former president of the New York, New Haven & Hartford and the Boston & Maine, about 250 employees of the Boston & Maine were present, and Mr. Mellen was presented with a set of resolutions, expressing appreciation of his attitude towards the employees while he was president, special reference being made to his decision that the employees might confer with the president on any subject once a month. Mr. Mellen spoke extemporaneously on the power and rights of labor.

Thomas J. Fardy, Jr., presented the resolutions, declaring that "Mr. Mellen has proved himself broader than his time, and linked his name with those of Lincoln and Grant as a man who has been misunderstood."

"It is a fine thing to be the 'old man' of such organizations as yours," said Mr. Mellen in reply to the address. "I would rather have your good will than all the salaries corporations could pay me.

"It is a unique thing, I think, for a railroad president, who has been called a human iceberg and whose doorknob is said to be covered with frost, to receive such a testimonial from the labor organizations among his former employees. Can you think I don't appreciate it? Don't you think it melts the ice a little?

"When I first met the employees on the B. & M. we did not seem to get together much for the first few meetings. I noticed that relations between members of the different organizations were rather strained, so I got them together and told them they must stand together and keep their eyes on the main chance; that it was better for them to compromise than to fight."

Mr. Mellen reminded his hearers of the powers they have as organizations, and warned them against disloyalty and impatience. There is a tremendous latent power in the labor organizations and the reason it does not receive greater reward is the jealousy between the different bodies and lack of loyalty to the common cause.

"Exercise your power with prudence," he said, "and remember that haste makes waste. Be fair, be prudent, be sure, but be steadfast one to the other. . . . I would like to lead, advise and help you. The time will come possibly, and when you call I will not be found wanting," he concluded amid cheers.

### Chicago Terminal Discussion.

The Chicago city council committee on railway terminals voted on Monday evening in favor of granting an ordinance providing for the location of the new Union passenger station on the site selected by the railways interested, between Jackson boulevard and Adams, Canal and Clinton streets. An ordinance containing several conditions will be drafted by a commission including representatives of the city, of the railways, John F. Wallace, Bion J. Arnold and representatives of the citizens' terminal committee and the Chicago Plan Commission. This action was taken after Mr. Wallace and Mr. Arnold, the engineering experts retained to advise the committee, had agreed that the erection of a new passenger terminal at Jackson street need not interfere with the general plans for future development of the terminal district, which include placing all other south side roads in the proposed new Illinois Central station on the lake front.

The council committee began a series of hearings last week for final consideration of the ordinances presented by the Union Station Company and of the engineering reports submitted by John F. Wallace and Bion J. Arnold. At the hearing on November 25, the officers of the Chicago Plan Commission presented an analysis of the two engineers' reports, together with recommendations of their own in which they opposed the building of a station north of Twelfth street, and insisted that the city delay action on the ordinances until a comprehensive plan for a reorganization of the terminals of the city can be worked out and the railways can be persuaded or compelled to carry out the plan best suited to the city.

At the hearing on November 28 a committee representing the Commercial Club presented a report by L. C. Fritch, chief engineer of the Chicago Great Western, who has made a study of the terminal question for the club. The Commercial Club Committee recommended that if the Pennsylvania Lines are permitted to establish their proposed freight terminal on the west side, the terminals should be located south of Harrison street, so as not to interfere with the future development of that thoroughfare; that all railway tracks north of Twelfth street be depressed below the level of the intersecting streets; and if the passenger station is to be erected on the site proposed between Jackson and Adams streets that the committee consider a site for the proposed postoffice building between the Union and North Western stations. Mr. Arnold and Mr. Wallace held several conferences for the purpose of reaching an agreement on as many as possible of the divergent opinions expressed in their reports. At the meeting on Monday evening at which the committee agreed on the site for the passenger station, they submitted a report outlining the points on which they had reached an agreement. These included the following:

The desirability of two general station sites, in addition to the present Northwestern station; one on the lake front, east of Michigan avenue and south of Twelfth street, and the other on the west side, between Canal street and the river.

Desirability of eventually straightening the river along some line far enough west to permit of the opening of all south side streets as far west as Franklin street.

The opening of Monroe street to permit of the construction of a new bridge across the river.

Desirability of gradually removing the encroachments of railroad property between Michigan avenue and the river.

The tracks north of Twelfth street to be placed underground, and ultimately covered and placed so as to permit the development of space above for warehouse or other commercial uses.

The desirability of the ultimate treatment of the La Salle street station and its facilities for suburban trains as per the Arnold report.

The desirability of handling all, or as much as possible, of non-Chicago freight now handled through the congested portion of the city at some point or points near the outskirts of the city, or outside the city itself.

The desirability of the establishment of a continuing technical board or commission, preferably of three men, to take up, consider and investigate, and to have jurisdiction over matters pertaining to railroad terminal questions, but so constituted that its powers will not conflict with the legislative powers of the city council, or of the powers of the state board of public utilities.

That the Union Station Company and railroad companies should pay or in some other manner compensate the city for all property vacated, or for other concessions granted.

At a meeting of the directors of the Union Station Company on November 25, officers were elected as follows: President, Joseph Wood, first vice-president Pennsylvania Lines West; secretary, W. G. White; treasurer, T. S. Howland, vice-president Chicago, Burlington & Quincy; controller, E. D. Sewall, vice-president Chicago, Milwaukee & St. Paul; general attorney, Robert Redfield. A vice-president is to be elected to have executive charge of the work of construction.

### Clean Stations.

One of the first things that the average traveler notes on arriving at a railroad station is the condition of the waiting rooms or ticket offices. Cleanliness is one of the missing virtues of many stations because the representative of the railroad company has not swept the cobwebs from his eyes nor learned by comparison how really and permanently attractive clean stations are. A man who is clean within is clean without, and thus the condition of the station may frequently be taken as an index of the mental make-up of the agent himself.

We should endeavor to remember that the general public is really interested in anything which adds to the attractiveness of their individual town and as the railroad station serves as an introduction to the community, it should be as spick and span as the agent's ingenuity and time will permit.—*Sunset Central Bulletin.*

### Safety and Sanitation Conference.

The National Association of Corporation Schools, 124 West Forty-second street, New York, will hold a conference on safety and sanitation at Rumford Hall, 50 East Forty-first street, New York City, December 10, 11 and 12, with sessions at 10 a. m. and 2 p. m. The conference is held under the auspices of the American Museum of Safety, and in connection with the International Exposition of Safety and Sanitation. Questions of safety in shops will be discussed by Dr. William H. Tolman, director of the American Museum of Safety, and safety problems in connection with transportation will be the subject of an address by a representative of the Pennsylvania Railroad. Among the speakers on the program are James O. Fagan, M. A. Dow and Dr. J. B. Hileman, medical examiner of the Pennsylvania Railroad.

### International Railway Congress.

At a meeting of the Permanent Commission of the International Railway Congress Association on July 5 last, V. Tondelier, president of the Executive Committee of the Belgian State Railways, was chosen president of the congress, succeeding Arthur Dubois, deceased. Mr. Tondelier is a graduate of the University of Ghent. He became a railway engineer immediately on graduation and for several years was the manager of the Belgian state railways. The vice-presidents of the congress are C. Colson, of France, and C. Ramaeckers, of Belgium.

The ninth session of the International Railway Congress will open in Berlin, Germany, in the second half of June, 1915.

### American Society of Civil Engineers.

At the regular business meeting of the American Society of Civil Engineers, held December 3, two papers were presented for discussion, as follows: Coal Piers on the Atlantic Seaboard, by J. E. Greiner, M. Am. Soc. C. E., and Topographical Surveys Made by the American Section of the International Boundary Commission, United States and Mexico, by W. W. Follett, M Am. Soc. C. E. These papers were printed in the *Proceedings* for October, 1913.

## MEETINGS AND CONVENTIONS.

*The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.*

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May, 1914.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, 1914, St. Louis.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Next convention, April 21, Houston, Tex.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Thursday and Friday in May.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Mid-year conference, New York, January 29, 30, 31.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConnaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 17-20, Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpen building, Chicago. June 15-17, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June and August, New York.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, Highland Park, Ill. Annual meeting, June 24, Minneapolis, Minn.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Next convention, May, 1914, St. Paul, Minn.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago. Next convention, May 20 23, New Orleans, La.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 9-10, Galveston, Tex.

ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Detroit, Mich. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomeroy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after second Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, May 20-22, Galveston, Tex.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago. Annual convention, May 18-22, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next Convention, July, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen building, Chicago. June 10-12, Atlantic City, N. J.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3rd Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York. Annual dinner, December 11, 1913, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, Chicago.

UTAH SOCIETY OF ENGINEERS.—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3rd Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Karpen building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

# Traffic News.

The Traffic Club of New York has chosen as president for the ensuing year, R. H. Wallace, general passenger agent of the Erie.

The directors of the American Express Company have declared a quarterly dividend of 2 per cent., thus reducing the annual rate from 12 per cent. paid since 1906 to 8 per cent.

The Atchison, Topeka & Santa Fe has announced that the Santa Fe-De Luxe train, the 63-hour extra-fare train from Chicago to southern California, will begin its third season on December 9, leaving Chicago on Tuesday of each week.

The special commission appointed by the governor of North Carolina to consider the protests of the railroads against the reductions in freight rates recently made by the legislature of North Carolina, will hold a hearing on Wednesday, December 17, at Raleigh. The chairman of the special commission is M. H. Justice.

The Merchants' Association of New York has adopted resolutions to the effect that the association will neither approve nor disapprove the application of the railroads for authority to make an increase in freight rates.

The freight commissioner of the Philadelphia Chamber of Commerce says that there is no opposition among the merchants of that city to the proposal of the railroads to increase freight rates 5 per cent.: except that rates to the west by rail and lake, which have been increased within the past few years, are deemed high enough, and increases would be opposed.

The Chicago Board of Trade has adopted resolutions regarding the proposed general advance in freight rates in part as follows:

"Resolved, That inasmuch as the commercial interests of the country require increased transportation facilities and more adequate service, which facilities apparently can only be secured by an increase in the revenues of the carriers; therefore, the Board of Trade of the city of Chicago favors a uniform advance of 5 per cent. in all rail rates, thereby furnishing the means to provide additional transportation facilities required.

"Inasmuch, however, as the necessities of the carriers for more revenue have been anticipated in the so-called ex-lake rates, which have been subject to successive increases averaging about 40 per cent., without a corresponding increase in the all-rail rates, we protest against further advances in such rates, as they are at the present time too high."

Reports from Boston say that the conferences which have been held between Commissioner Prouty, of the Interstate Commerce Commission, and representatives of a number of state commissions, have resulted in an agreement which will soon produce orders, both from the federal and the state bodies, allowing the Boston & Maine to make substantial increases in its freight rates.

The Pennsylvania Railroad announces that the exchange of mileage coupons at station ticket offices for passengers boarding sleeping cars is now authorized at Philadelphia, New York, Newark, Jersey City, Trenton, Phillipsburg, Lancaster and Harrisburg. Anyone intending to ride on a train overnight, can take his mileage book to the ticket office and exchange the required number of miles for an ordinary ticket.

The directors of the Merchants' Association of New York City, have sent a memorial to the State Public Service Commission, for the Second district, asking that the Interstate Commerce Commission plan for dividing the country into blocks for the purpose of making rates for the transportation of goods by express, be not adopted in New York, except with certain modifications, as set forth by the Association's Traffic Bureau.

In the Federal Court at Philadelphia, November 25, indictments were returned, by the Grand Jury, charging the Pennsylvania Railroad with illegal discrimination in not collecting demurrage charges on certain shipments to L. F. Miller & Sons. The road is also charged with violation of the law in failing to collect storage and elevator charges; also for paying false claims for loss of merchandise, the weights of shipment having been mis-stated for this purpose.

The Waycross & Western, a company which is building a railroad from Waycross, Ga., southwest to Ray's Mills, 51 miles, has taken measures to develop stock raising on a large and scientific plan. Alex. K. Sessoms, president of the road, has ordered material for fencing 2,000 acres of land for a stock farm. The farm will be located at a place called Kings, named after the superintendent of the road. Workmen have been busy for several weeks erecting barns and houses at Kings.

Shipments of iron ore from the seven docks at Duluth, Superior, Two Harbors and Ashland, this year, to eastern lake ports have amounted to 40,533,413 tons. The total from these docks in 1912 was 38,904,361 tons. Following are the details:

| Docks— | 1913. | 1912. |
|---|---|---|
| Duluth, Missabe & Northern | 12,331,126 | 10,495,577 |
| Great Northern | 13,060,811 | 13,535,602 |
| Duluth & Iron Range | 10,075,718 | 9,370,969 |
| Northwestern (Ashland) | 3,505,838 | 3,778,614 |
| Soo (Ashland) | 832,392 | 1,018,487 |
| Soo (Superior) | 696,334 | 305,112 |
| North Pacific (Superior) (new) | 31,194 | ..... |
| Totals | 40,533,413 | 38,904,361 |

On the occasion of an Agricultural Conference held in Philadelphia this week, the Pennsylvania Railroad brought to that city by special trains 2,000 visitors from the corn-growing sections of Ohio; 1,500 junior and 500 senior contestants in a "corn raising contest" conducted by the Ohio Corn Growers' Association this year. The visitors will go also to several other eastern cities. In connection with the conference a corn show will be held in the Philadelphia Bourse, at which will be awarded 96 prizes ranging from $100 to $300 each. The corn will be judged by representatives of the State Agricultural Colleges of Pennsylvania, New Jersey, Delaware and Maryland, and the Commercial Exchange of Philadelphia. The prizes have been offered by the Corn Exchange National Bank of Philadelphia.

### Traffic Club of New York.

At the annual meeting of the Traffic Club of New York on November 25, the following officers were elected for the coming year: President, R. H. Wallace, general passenger agent, Erie Railroad; vice-presidents, W. J. L. Banham, traffic manager, Otis Elevator Company, W. W. Hall, general agent, C. M. & St. P., J. T. Rogers, traffic manager, The Edison Companies, W. H. Snell, general agent, passenger department, Canadian Pacific, A. J. Zock, freight agent, Hamburg-American Line; treasurer, Frank C. Earle, 291 Broadway; secretary, C. A. Swope, eastern freight agent, Louisville & Nashville, and for the board of governors, J. L. Carling, W. J. Love, W. H. DeWitt, Jr.

### Car Surpluses and Shortages.

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 155-A, giving a summary of car surpluses and shortages by groups from August 1, 1912, to November 15, 1913, says: The total surplus on November 15, 1913, was 46,059 cars; on November 1, 1913, 38,276 cars, and on November 7, 1912, 19,897 cars. Compared with the preceding period; there is an increase of 7,783 cars, of which 4,360 is in box, 3,800 in coal and gondola, and a decrease of 158 in flat and 219 miscellaneous car surplus. The increase in box car surplus is in groups 2 (New York, New Jersey, Delaware, Maryland and East Pennsylvania); 3 (Ohio, Indiana, Michigan and West Pennsylvania); 4 (the Virginias and Carolinas); 6 (Iowa, Illinois, Wisconsin and Minnesota); 8 (Kansas, Colorado, Oklahoma, Missouri and Arkansas); 10 (Washington, Oregon, Idaho, California, Nevada and Arizona) and 11 (Canadian lines). The increase in coal and gondola car surplus is in groups 2, 3, 4, 6 (as above), 7 (Montana, Wyoming, Nebraska and the Dakotas); 8 and 10 (as above). The decrease in flat car surplus is in groups 4 (as above), 5 (Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida); 6, 7, 9 (Texas, Louisiana and Mexico) and 10 (as above). The decrease in miscellaneous car surplus is in groups 2, 5, 6, 7 and 8 (as above).

The total shortage on November 15, 1913, was 23,407 cars; on November 1, 1913, 40,118 cars, and on November 7, 1912, 71,156

cars. Compared with the preceding period; there is a decrease in the total car shortage of 16,711, of which 13,278 is in box and 4,118 in coal and gondola, and an increase of 145 cars in flat and 540 in miscellaneous car shortage. The decrease in box car shortage is in groups 1 (New England lines), 2, 3, 4, 6 and 10 (as above). The decrease in coal and gondola car shortage is in all groups, except 5, 8 and 9 (as above). The increase in flat car shortage is in groups 2, 4, 5 and 6 (as above). The increase in miscellaneous car shortage is in groups 1, 2, 5, 8 and 11 (as above).

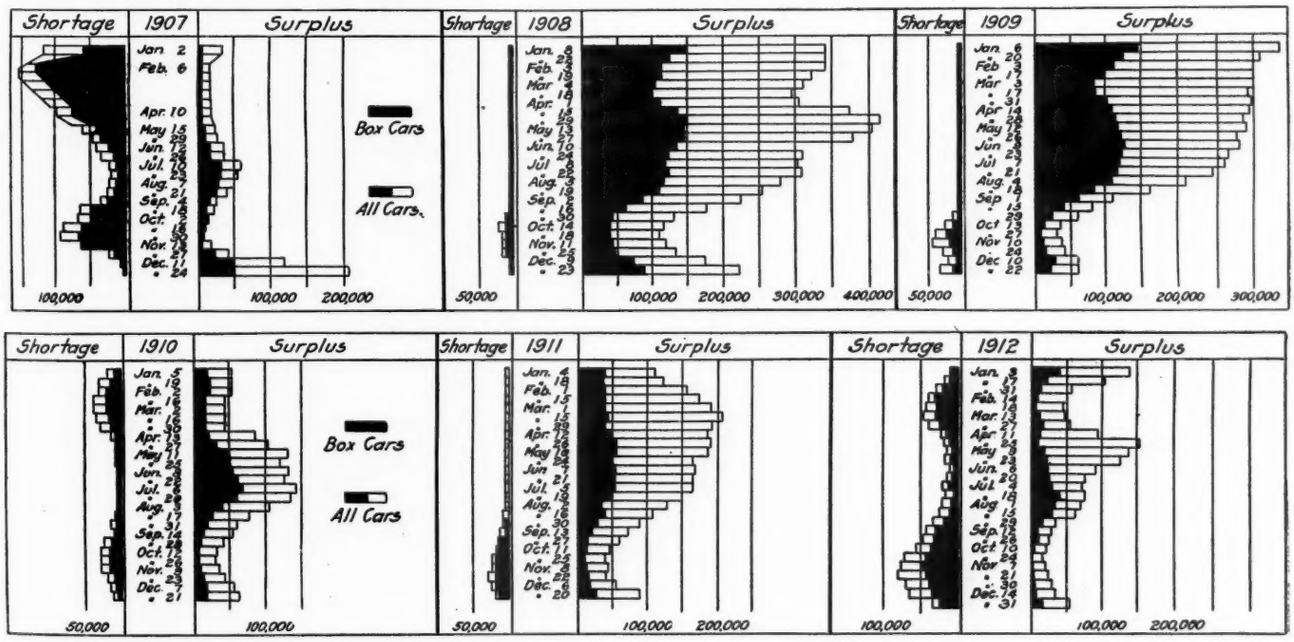
Compared with the corresponding period of 1912; there is an increase in the total car surplus of 26,162 cars, of which 14,957 is in box, 1,663 in flat, 3,258 in coal and gondola and 6,284 in miscellaneous car surplus. There is a decrease in the total car shortage of 47,749 cars, of which 36,823 is in box, 3,488 in flat, 6,334 in coal and gondola and 1,104 in miscellaneous car shortage.

The accompanying table gives car surplus and shortage figures by groups for the last period covered in the report and the diagram shows total bi-weekly surpluses and shortages from 1907 to 1913.

CAR SURPLUSES AND SHORTAGES.

| Date | No. of roads. | Surpluses: Box. | Flat. | Coal, goldola and hopper. | Other kinds. | Total. | Shortages: Box. | Flat. | Coal, gondola and hopper. | Other kinds. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Group *1.—November 15, 1913 | 8 | 0 | 58 | 14 | 291 | 363 | 121 | 73 | 15 | 436 | 645 |
| " 2.— " 15, 1913 | 31 | 564 | 52 | 2,857 | 113 | 3,586 | 716 | 700 | 293 | 0 | 1,709 |
| " 3.— " 15, 1913 | 25 | 1,180 | 438 | 328 | 832 | 2,782 | 1,753 | 50 | 1,704 | 1,162 | 4,669 |
| " 4.— " 15, 1913 | 13 | 3,750 | 438 | 1,102 | 576 | 5,866 | 1,138 | 460 | 4,454 | 490 | 6,542 |
| " 5.— " 15, 1913 | 24 | 40 | 145 | 250 | 468 | 903 | 1,705 | 145 | 1,414 | 59 | 3,323 |
| " 6.— " 15, 1913 | 29 | 4,349 | 142 | 1,300 | 2,254 | 8,045 | 591 | 53 | 64 | 344 | 1,052 |
| " 7.— " 15, 1913 | 3 | 95 | 24 | 359 | 239 | 717 | 133 | 0 | 20 | 0 | 153 |
| " 8.— " 15, 1913 | 18 | 912 | 365 | 1,461 | 1,793 | 4,531 | 992 | 23 | 398 | 58 | 1,471 |
| " 9.— " 15, 1913 | 15 | 1,773 | 137 | 509 | 810 | 3,229 | 292 | 6 | 42 | 19 | 359 |
| " 10.— " 15, 1913 | 23 | 3,671 | 998 | 2,340 | 6,579 | 13,588 | 821 | 94 | 73 | 345 | 1,333 |
| " 11.— " 15, 1913 | 6 | 1,251 | 417 | 0 | 781 | 2,449 | 1,378 | 72 | 0 | 701 | 2,151 |
| Total | 195 | 17,589 | 3,214 | 10,520 | 14,736 | 46,059 | 9,640 | 1,676 | 8,477 | 3,614 | 23,407 |

*Group 1 is composed of New England lines; Group 2—New York, New Jersey, Delaware, Maryland and Eastern Pennsylvania lines; Group 3—Ohio, Indiana, Michigan and Western Pennsylvania lines; Group 4—West Virginia, Virginia, North and South Carolina lines; Group 5—Kentucky, Tennessee, Mississippi, Alabama, Georgia and Florida lines; Group 6—Iowa, Illinois, Wisconsin and Minnesota lines; Group 7—Montana, Wyoming, Nebraska, North Dakota and South Dakota lines; Group 8—Kansas, Colorado, Missouri, Arkansas and Oklahoma lines; Group 9—Texas, Louisiana and New Mexico lines; Group 10—Washington, Oregon, Idaho, California, Nevada and Arizona lines; Group 11—Canadian lines.




Car Surpluses and Shortages, 1907 to 1913.

## INTERSTATE COMMERCE COMMISSION.

The Chicago Coal Dealers' Association has filed a protest with the Interstate Commerce Commission against the proposed 5 per cent. advance in rates on coal included in the general rate advance asked by the eastern railways.

The Omaha Grain Exchange has filed with the Interstate Commerce Commission a complaint against the Northern Pacific and Chicago, Burlington & Quincy, charging excessive and discriminatory rates on grain from points in Montana to Omaha, South Omaha and Council Bluffs.

The commission has suspended from November 25 until March 25 a Denver & Salt Lake tariff by which it was proposed to increase rates on soft coal, from Oak Hills and other mines in the same district in Colorado to points located on the Rock Island lines in Kansas, Nebraska and Missouri.

The commission has further suspended from December 5 to June 5 a schedule in a Missouri Pacific tariff by which it was proposed to increase the refrigeration charge on shipments of fruits and vegetables from Denver and other Colorado points to Wichita, Hutchinson and other Kansas points.

The commission has suspended from December 1 to March 31 a rule in an Illinois Central tariff which proposed to increase from 10,000 lbs. to 15,000 lbs. the minimum weight upon shipments of dressed poultry, meats, fish, game and dairy products, loaded in refrigerator cars moving from Chicago and other sta-

tions on the Illinois Central exclusive of St. Louis, Mo., and East St. Louis, Ill., and destined to points in Florida, Georgia and other southeastern states.

The commission has suspended from November 25 until March 25 the tariff of the Buffalo, Attica & Arcade, which proposed to cancel the present charge of $3 per car for switching between industries and team tracks on the Buffalo, Attica & Arcade and the Buffalo & Susquehanna at Arcade, N. Y., leaving no rate in effect.

The commission has further suspended from December 13 to June 13 Atchison, Topeka & Santa Fe tariff schedules by which it was proposed to increase the estimated weights applicable to carload shipments of cantaloupes in crates moving from points in New Mexico, Colorado and Kansas to New York and other markets.

The commission has suspended from November 29 to March 29 a St. Louis & San Francisco tariff by which it is proposed to withdraw milling in transit privileges on grain and seed at certain milling points located on the lines of the St. Louis & San Francisco and the Kansas City, Clinton & Springfield, including Joplin, Mo.

The commission has suspended until March 31 tariffs of the Illinois Central, Missouri Pacific, St. Louis, Iron Mountain & Southern, and Mobile & Ohio, by which it was proposed to increase by 1 cent per 100 lbs., the proportional rates on grain, originating from beyond, from St. Louis and East St. Louis to Cairo, Ill. The present rate is 4 cents per 100 lbs.

The commission has suspended from November 29 to March 29 part of a tariff issued by E. H. Hinton, agent, which contains rates from 1 to 7 cents per 100 lbs. higher than the present class rates and rates on iron and steel articles moving from Knoxville, Tenn., to certain stations located on the Cincinnati, New Orleans & Texas Pacific in Kentucky and Tennessee.

The commission has suspended from November 15 until March 15 the supplement to the tariff of the Louisville & Nashville, which contains schedules by which it is proposed to effect increases, ranging in amount from 3 to 7 cents per 100 lbs. in rates on products of cottonseed oil, C. L., from New Orleans, La., and Gulfport, Miss., to the Ohio river and certain other points north thereof.

The commission has suspended from December 2 until April 1 certain schedules in an Erie & Western Transportation Company tariff in which it was proposed to add to the list of articles the transportation of which is prohibited by this carrier—butter, eggs, fresh meats and live or dressed poultry. The commission has already suspended until February 14 tariffs of other carriers which contain a like prohibition.

The commission has further suspended from November 29 until May 29 the items in Agent W. H. Hosmer's tariffs, which contain substantial advances in rates on iron and steel articles, c. l., including old and new rails, steel crossties, and other articles of that nature, between Chicago, Peoria and other points east of the Mississippi river and Des Moines, Ia., Sioux City, Iowa, Sioux Falls, S. D., and other points west of the Mississippi.

The commission has suspended from November 25 until March certain schedules in tariffs of the Illinois Central and the Louisville & Nashville. Tariffs of the above-named carriers now provide for an allowance of ¼ cent per bushel for elevation or transfer of grain, c. l., at St. Louis, Mo., and East St. Louis, Ill., when same is destined to certain points south and east thereof, including Evansville, Ind. It was proposed by the suspended schedules to cancel such allowance on grain destined to Evansville.

The commission has suspended from November 25 until March 25 the supplement to Agent W. P. Emerson's tariff, which contains a proposed increase of 1½ cents per 100 lbs. in rates applicable to the transportation of coffee, C. L., from New Orleans and Port Chalmette, La., to Cincinnati, Louisville, Cairo, St. Louis, Chicago and Milwaukee, and a proposed increase of 2.4 cents per 100 lbs. on the same traffic to Dubuque, Iowa. The present rate to Chicago is 25 cents and the proposed rate is 26.5 cents.

The commission has suspended from November 20 and December 5, respectively, until March 20, the schedules in a supplement to the tariff of the Northern Pacific and the supplement to the tariff of the Chicago, Milwaukee & St. Paul, which proposed to withdraw the present commodity rates applicable to the transportation of cement, c. l., from Mason City, Ia., and other points to certain points in Minnesota and North Dakota located on the Northern Pacific, class rates to apply on after the effective dates thereof. This would result in material increases; for example, the present rate from Mason City, Ia., to Fargo, N. D., is 17 cents per 100 lbs., and the proposed class rate is 28 cents per 100 lbs.

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**Complaint Dismissed.**

*East Dubuque Supply Company v. Illinois Central. Opinion by the commission:*

The commission finds that a rate of 5 cents per 100 lbs. on beer in carloads from Dubuque, Iowa, to East Dubuque, Ill., is not unreasonable. (28 I. C. C., 425.)

*Meridian Board of Trade & Cotton Exchange v. Alabama, Great Southern, et al. Opinion by Commissioner Prouty:*

The commission found that the present adjustment of rates from Mobile and Tusculoosa, Ala., to stations on the Tombigbee Valley and Alabama, Tennessee & Northern railroads, was not discriminatory as against the rates from Meridian, Miss. (28 I. C. C., 360.)

*Birge-Forbes Company v. Missouri, Kansas & Texas, et al. Opinion by the Commission:*

The complainant contends that the rates charged by the defendant for transportation of certain shipments of cotton from points in Oklahoma to New Orleans, La., are unreasonable and unjustly discriminatory. Reparation is asked. The commission found that the evidence was not conclusive. (28 I. C. C., 409.)

*Clinton Sugar Refining Company v. Chicago & North Western Railway Company. Opinion by Commissioner Prouty:*

Under the tariffs of the defendant in force between May 3, 1910, and August 15, 1912, taken in connection with the requirements announced by the commission touching the shipment of the products of grain milled in transit, the complainant is not entitled to a recovery on account of unused transit. (28 I. C. C., 364.)

*American Brake Shoe & Foundry Company v. Belt Railway Company of Chattanooga, et al. Opinion by Commissioner Prouty:*

The commission decided that the rule of the carriers, providing that where cars are switched to private scales for weighing, a charge of fifty cents per car would be made unless weights so ascertained were used for the assessment of freight charges, was not unreasonable. (28 I. C. C., 350.)

*National Coal Company v. Baltimore & Ohio. Opinion by Commissioner Marble:*

A carrier rated a coal mine and distributed cars to it strictly in accordance with established rules, fairly adopted after consultation with and approval by mine operators. The commission found that such carrier cannot be held guilty of undue discrimination against such mine on a showing that the shipper's commercial misfortunes in the months used, under the rules, to determine the rating of the mine, operated to reduce such rating. (28 I. C. C., 442.)

*Charles F. Schmidt & Peters, Inc., v. Atchison, Topeka & Santa Fe, et al. Opinion by the Commission:*

The complainant contends that the rate of $2.25 per 100 lbs., any quantity, for the transportation of champagne from New York to California terminals, is unreasonable and discriminatory to the extent that it exceeds $1.55 per 100 lbs. in carloads, minimum weight 30,000 lbs., and a less-than-carload rate of $2.00 per 100 lbs. Reparation is asked. The commission decided that the present rates were not shown to have been unreasonable. (28 I. C. C., 376.)

*Minneapolis Cereal Company v. Chicago & North Western, et al. Opinion by the Commission:*

The complainant alleges that unreasonable charges were collected by the defendant for the transportation of carload and less-than-carload shipments of the cereal food "Cream of Rye," containing premiums, from Belle Plaine to points in western and official classification territories. Reparation and the establish-

ment of reasonable rates are asked. The commission decided that the charges paid by the complainant under the rules in question are not unreasonable or discriminatory. (28 I. C. C., 415.)

*H. L. Keats Auto Company v. Oregon-Washington Railroad & Navigation Company, et al.*

*Menzies-DuBois Auto Company v. Oregon-Washington Railroad & Navigation Company, et al. Opinion by the Commission:*

The complainants contend that the less-than-carload rates of $7.00 per 100 lbs. on shipments of automobiles from New York and Syracuse, N. Y., to Portland, Ore., are unreasonable to the extent that they exceed $4.50 per 100 lbs. The commission found that the evidence was not conclusive. (28 I. C. C., 412.)

### Rate of Twenty-Three Cents on Coffee Reasonable.

*Traffic Association of St. Louis Coffee Importers v. Illinois Central, et al Opinion by the commission:*

The complainants allege that the rate of 23 cents per 100 lbs. for the transportation of coffee in carloads from New Orleans, La., to St. Louis, Mo., is unreasonable and discriminatory to St. Louis as compared with the rates on coffee from New Orleans, to Indianapolis, Ind., or the rates on sugar from New Orleans to St. Louis. The commission finds, however, that the present rates are reasonable, and therefore dismisses the complaint. (28 I. C. C., 484.)

### The Free Return of Exhibits.

*The Dairymen's Supply Company v. Pennsylvania Railroad et al. Opinion by the commission:*

The complainant claims that it is discriminated against because the defendants refuse to return free certain exhibits at a dairy show while making it a practice to return free exhibits at state and county fairs. The complaint is dismissed on the ground that a dairy show is an industrial exposition run for the purpose of advertising, while state fairs, etc., are for educational purposes. (28 I. C. C., 406.)

### Detroit Switching Charges.

*Opinion by Commissioner Prouty:*

The commission finds that the Michigan Central and Pere Marquette have failed to show proper justification for increases in charges for switching at Detroit, Mich., and finds that their present charges are just and reasonable. The Detroit Terminal Railroad also has not justified its proposed increases, but it is allowed to recast and somewhat increase its present switching charges. Hereafter it may charge not to exceed $4.50 per car for a switching movement between any two points on its line. (28 I. C. C., 494.)

### Complaint Dismissed.

*Milwaukee Maltsters' Traffic Association v. Grand Trunk Western et al. Opinion by the commission:*

The commission finds that the defendants' refusal to allow one-fourth cent for the elevation and transfer at Milwaukee, Wis., of barley converted into malt at that place while paying this allowance for the elevation and transfer of barley and other grain which has been clipped, cleaned, blown or mixed, does not result in unjust discrimination. The maltsters do not perform a transportation service, for in the case of barley converted into malt there is no real elevation. Whereas grain is delivered into the elevator, not grain but a manufactured and more valuable product of grain is unloaded out of it. Moreover, as it is, the maltsters are malting barley in transit and are thus paying for but a single service of transportation as though there were no stop for manufacturing purposes at Milwaukee. (28 I. C. C., 489.)

## STATE COMMISSIONS.

In a report on an accident to a passenger train at Chelsea, Okla., on October 20, the Oklahoma Corporation Commission recommends that the St. Louis & San Francisco spend $3,000 a mile in improving its lines in the state. The commission is now making a general physical investigation of the road.

It is expected that the National Association of Railway Commissioners' committee conference on express matters, to be held at Chicago December 11, will be attended by one member from each state commission. The question of a uniform method of stating intrastate express rates should be determined promptly. The express companies have been asked to be represented and have signified their intention of doing so.

E. C. Hurd, chief engineer of the Nebraska State Railway Commission, in charge of valuation, has resigned and will engage in private practice in Lincoln and Chicago. C. H. Gerber, principal assistant engineer, will assume Mr. Hurd's duties. Mr. Hurd has had charge of this work since June, 1909. It included valuation not only of the property of railroads, but also that of express companies, and telegraph and telephone lines. The work is now practically completed. He has been engaged in general engineering work for about 20 years.

## COURT NEWS.

The Supreme Court of the United States has sustained the district court of the western district of New York in a decision imposing a fine of $2,000 on the Delaware, Lackawanna & Western for violation of the commodities clause of the Interstate commerce law. The railroad transported hay from Black Rock, N. Y., to Scranton, Pa., to be sold to or used in its own coal mine stables.

A hearing was begun before the United States District Court at Baton Rouge, La., on November 27 on a suit filed by the Illinois Central and the Yazoo & Mississippi Valley railways to test the authority of the Louisiana railroad commission to prescribe flagging rules. The witnesses included F. C. Rice, chairman of the transportation committee of the American Railway Association, and W. L. Park, vice-president of the Illinois Central.

The Supreme Court of the United States has handed down a decision which sustains as valid the order of the Interstate Commerce Commission prescribing a system of accounts for the Kansas City Southern. The decision upholds that clause of the interstate commerce law which authorizes the commission to prescribe a system of accounts. The railroad company entered suit, challenging the authority of the commission to require depreciation to be charged according to an arbitrary rule.

The United States Circuit Court of Appeals, at St. Louis, November 28, decided in favor of the Chicago, Burlington & Quincy in the suit of that road, in the district court at Kansas City, claiming that the federal law, requiring the use of air brakes on freight trains, does not apply to switching operations. The court's opinion said the evident intention of Congress in passing the act was to exempt purely switching operations because it would take more than twice as much time to switch cars if they must have the air coupled each time. Judge Hook, dissenting, declared that since the same dangers existed on switching trains as on regular trains there should be no exemption in this case. He further referred to the fact that the law does not exempt switching operations.

In the United States District Court at Macon, Ga., November 24, the Seaboard Air Line Railway Company, indicted on thirteen counts for violation of the act to regulate commerce, entered pleas of guilty to two of the counts and was fined $1,000 on each by Judge W. B. Shepherd, after which District Attorney Akerman nol prossed the remaining eleven counts. The indictment was based on the allegation that the Seaboard had accepted concessions from the Southern Railway on shipments of bituminous coal from Briceville and Oliver Springs, Tenn., to Williams, Ga. Between those points a joint rate of $2.45 a ton prevailed, the Southern Railway bringing the coal from Tennessee to Helena, Ga., where it was turned over to the Seaboard, to be transported to Williams. It was alleged that the Seaboard paid the Southern Railway its pro rata share of the rate, or $1.36 a ton, but did not take the coal on to Williams.

The Supreme Court of the United States has decided that there was no discrimination against refineries at Yonkers in the allowance by the trunk line railroads of lighterage to the Arbuckle Sugar Refineries in New York Harbor. The litigation was begun by the Federal Refinery, at Yonkers, to get the same allowance for lightering its sugar as was allowed to the Arbuckle Refineries, which are within the New

## REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1913.

| Name of road. | Average mileage operated during period. | Operating revenues | | | Operating expenses | | | | | | Net operating revenue (or deficit). | Outside operations, net. | Taxes. | Operating income (or loss). | Increase (or decr.) comp. with last year. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Freight. | Passenger. | Total, inc. misc. | Maintenance: Way and structures. | Maintenance: Of equipment. | Traffic. | Transportation. | General. | Total. | | | | | |
| Boston & Maine | 2,252 | $2,370,188 | $1,659,082 | $4,344,016 | $713,601 | $673,116 | $44,898 | $1,847,388 | $96,471 | $3,375,474 | $968,542 | $15,799 | $154,521 | $829,820 | —$328,384 |
| New York, Philadelphia & Norfolk | 112 | 234,680 | 52,055 | 312,557 | 26,970 | 66,461 | 4,356 | 134,558 | 14,585 | 246,930 | 65,627 | ..... | 8,000 | 57,627 | —10,622 |
| St. Louis Southwestern of Texas | 811 | 272,560 | 108,169 | 410,190 | 80,789 | 110,073 | 12,137 | 162,622 | 18,457 | 384,088 | 26,112 | —228 | 17,800 | 8,084 | —75,272 |
| Ulster & Delaware | 129 | 64,247 | 33,004 | 102,844 | 17,584 | 12,133 | 1,228 | 44,353 | 2,972 | 78,270 | 24,574 | 44 | 3,500 | 21,118 | 176 |
| THREE MONTHS OF FISCAL YEAR, 1914—CONTINUED. | | | | | | | | | | | | | | | |
| Alabama Great Southern | 309 | $842,297 | $370,041 | $1,317,874 | $161,892 | $328,907 | $40,707 | $434,935 | $27,167 | $993,608 | $324,266 | —$1,069 | $46,700 | $276,497 | $38,636 |
| Arizona Eastern | 367 | 508,308 | 114,611 | 656,723 | 91,514 | 97,916 | 6,163 | 191,166 | 33,416 | 420,175 | 236,548 | 41 | 36,940 | 199,649 | —98,067 |
| Atlantic & St. Lawrence | 167 | 219,005 | 115,368 | 363,868 | 86,883 | 53,390 | 12,348 | 173,606 | 12,267 | 338,494 | 25,374 | ..... | 30,471 | —5,097 | 23,338 |
| Atlantic City | 167 | 209,657 | 780,456 | 1,036,581 | 79,112 | 38,759 | 13,612 | 428,505 | 6,207 | 566,195 | 470,386 | —12,527 | 27,000 | 430,859 | 58,159 |
| Baltimore & Ohio—System | 4,456 | 21,149,012 | 4,877,672 | 27,479,818 | 3,679,437 | 4,374,220 | 586,179 | 9,765,736 | 588,055 | 18,993,627 | 8,486,191 | —214,445 | 794,737 | 7,477,009 | 511,386 |
| Bingham & Garfield | 26 | 409,901 | 13,396 | 425,085 | 22,221 | 59,599 | 2,977 | 70,096 | 7,107 | 162,000 | 263,085 | ..... | 8,650 | 254,435 | 63,457 |
| Boston & Maine | 2,252 | 7,067,318 | 5,177,498 | 13,201,094 | 1,888,720 | 1,975,561 | 113,745 | 5,506,593 | 304,435 | 9,789,054 | 3,412,040 | 74,284 | 486,962 | 2,999,362 | —645,090 |
| Butte, Anaconda & Pacific | 90 | 288,169 | 55,554 | 373,887 | 49,639 | 56,366 | 2,068 | 132,245 | 11,246 | 251,564 | 122,323 | ..... | 6,750 | 115,573 | 63,774 |
| Canadian Pacific Lines in Maine | 233 | 135,286 | 73,592 | 234,881 | 111,830 | 44,892 | 18,871 | 108,012 | 14,935 | 298,540 | —63,659 | ..... | 33,000 | —96,659 | —5,669 |
| Central Vermont | 536 | 690,595 | 370,244 | 1,142,327 | 231,480 | 185,460 | 24,784 | 521,009 | 22,898 | 985,631 | 156,696 | 2,534 | 46,500 | 112,730 | —115,897 |
| Chicago & Eastern Illinois | 1,282 | 3,096,047 | 857,440 | 4,288,063 | 861,896 | 970,662 | 69,595 | 1,496,737 | 116,163 | 3,515,053 | 773,010 | —8,694 | 135,000 | 629,316 | —313,005 |
| Chicago, Indianapolis & Louisville | 617 | 1,217,076 | 494,812 | 1,867,972 | 284,523 | 276,277 | 59,151 | 650,570 | 47,655 | 1,318,176 | 545,796 | ..... | 73,117 | 476,679 | —28,079 |
| Chicago, Milwaukee & St. Paul | 9,690 | 16,609,833 | 5,723,482 | 24,286,751 | 3,661,507 | 3,714,356 | 511,626 | 8,281,797 | 434,789 | 16,604,075 | 7,682,676 | 128,699 | 1,063,176 | 6,748,179 | —1,662,542 |
| Cincinnati, New Orleans & Texas Pacific | 337 | 1,925,601 | 530,581 | 2,584,428 | 266,694 | 647,311 | 75,328 | 756,973 | 57,140 | 1,773,446 | 810,982 | —761 | 89,000 | 721,221 | —44,042 |
| Colorado & Southern | 1,131 | 1,685,878 | 564,143 | 2,367,415 | 340,778 | 541,569 | 36,775 | 649,708 | 64,102 | 1,632,932 | 734,483 | —3,844 | 92,025 | 638,614 | 144,237 |
| Delaware & Hudson Co.—R. R. Dept | 854 | 5,090,270 | 1,199,748 | 6,473,895 | 479,443 | 912,299 | 86,079 | 2,095,809 | 188,168 | 3,761,798 | 2,712,097 | —7,030 | 149,100 | 2,555,967 | —18,399 |
| Denver & Rio Grande | 2,585 | 4,499,837 | 1,822,779 | 6,623,529 | 1,325,747 | 1,170,709 | 134,785 | 1,877,930 | 160,021 | 4,669,192 | 1,954,337 | 21,308 | 272,600 | 1,703,045 | —179,374 |
| Detroit & Toledo Shore Line | 79 | 371,445 | ..... | 373,144 | 45,102 | 20,393 | 4,106 | 104,295 | 8,067 | 181,963 | 191,181 | ..... | 17,700 | 173,481 | 47,797 |
| Detroit, Grand Haven & Milwaukee | 191 | 343,500 | 211,500 | 640,998 | 78,877 | 83,840 | 19,966 | 307,098 | 16,009 | 505,790 | 135,208 | 425 | 10,800 | 124,833 | 117,564 |
| Duluth, South Shore & Atlantic | 627 | 555,770 | 351,276 | 977,335 | 268,615 | 108,525 | 26,422 | 333,627 | 36,185 | 773,374 | 203,961 | 7,495 | 54,000 | 157,456 | —27,432 |
| Duluth, Winnipeg & Pacific | 166 | 353,779 | 71,577 | 434,588 | 97,407 | 53,673 | 6,696 | 156,909 | 16,677 | 331,362 | 103,226 | ..... | 21,741 | 81,485 | 42,620 |
| Florida East Coast | 683 | 421,442 | 316,043 | 846,628 | 238,357 | 192,081 | 14,972 | 380,669 | 31,656 | 857,705 | —11,077 | —4,668 | 60,000 | —75,745 | —67,968 |
| Fort Worth & Denver City | 454 | 769,713 | 475,618 | 1,307,554 | 185,661 | 254,295 | 24,200 | 471,343 | 43,650 | 979,149 | 328,405 | —2,366 | 48,800 | 277,239 | —179,200 |
| Galveston, Harrisburg & San Antonio | 1,338 | 2,136,880 | 826,616 | 3,117,210 | 314,236 | 591,092 | 96,434 | 1,163,021 | 100,099 | 2,264,882 | 852,328 | —6,595 | 182,411 | 663,322 | —105,535 |
| Georgia | 307 | 479,048 | 242,951 | 772,862 | 101,702 | 137,225 | 34,224 | 371,554 | 27,683 | 672,388 | 100,474 | ..... | 8,864 | 91,610 | 25,753 |
| Grand Trunk Western | 347 | 1,089,000 | 671,500 | 1,876,193 | 263,348 | 327,992 | 67,168 | 835,799 | 45,907 | 1,543,814 | 332,379 | —4,037 | 94,500 | 233,842 | —167,812 |
| Great Northern | 7,748 | 16,764,261 | 4,902,364 | 23,078,696 | 3,559,984 | 2,458,848 | 343,379 | 5,573,560 | 347,850 | 12,283,621 | 10,795,075 | 117,751 | 1,199,577 | 9,713,249 | 857,559 |
| Hocking Valley | 352 | 1,861,000 | 282,013 | 2,316,678 | 262,715 | 412,582 | 26,056 | 680,167 | 44,863 | 1,426,383 | 890,295 | ..... | 123,000 | 767,295 | 2,109 |
| Houston, East & West Texas | 191 | 208,749 | 111,824 | 339,024 | 54,846 | 40,003 | 5,887 | 116,118 | 12,104 | 228,958 | 110,066 | ..... | 18,738 | 91,328 | —10,835 |
| Houston & Texas Central | 789 | 1,194,188 | 575,341 | 1,882,259 | 239,894 | 269,693 | 47,151 | 772,219 | 53,016 | 1,381,973 | 500,286 | —305 | 99,446 | 400,535 | —100,087 |
| International & Great Northern | 1,160 | 1,910,130 | 649,141 | 2,719,949 | 326,468 | 358,110 | 78,805 | 1,072,393 | 94,230 | 1,930,006 | 789,943 | —4,133 | 64,841 | 720,969 | —118,465 |
| Louisiana & Arkansas | 279 | 338,176 | 70,790 | 423,717 | 75,025 | 63,099 | 7,512 | 105,501 | 15,343 | 266,480 | 157,237 | ..... | 12,499 | 144,738 | 15,132 |
| Louisiana Western | 208 | 352,077 | 192,171 | 572,308 | 61,049 | 125,999 | 21,636 | 170,158 | 19,157 | 397,999 | 174,309 | 928 | 22,125 | 153,112 | —31,313 |
| Minneapolis, St. Paul & Sault Ste. Marie | 3,976 | 5,462,151 | 2,104,957 | 8,023,662 | 1,134,241 | 1,214,089 | 171,618 | 2,419,532 | 159,212 | 5,098,692 | 2,924,970 | 76,628 | 367,897 | 2,629,701 | —295,546 |
| Missouri, Kansas & Texas System | 3,817 | 5,279,410 | 2,620,818 | 8,460,713 | 1,379,891 | 1,039,393 | 189,834 | 3,047,433 | 271,745 | 5,928,296 | 2,532,417 | —32,553 | 320,992 | 2,178,872 | 43,036 |
| Missouri, Oklahoma & Gulf | 332 | 214,084 | 68,938 | 293,564 | 52,237 | 46,616 | 17,818 | 129,140 | 19,142 | 264,953 | 28,611 | 1,362 | 18,000 | 11,973 | 12,545 |
| Morgan's La. & Texas R. R. & S. S. Co. | 404 | 697,142 | 301,670 | 1,076,850 | 132,557 | 227,819 | 34,793 | 442,011 | 36,988 | 874,168 | 202,682 | —4,573 | 54,750 | 143,359 | 49,166 |
| New Orleans, Texas & Mexico | 286 | 292,537 | 54,670 | 368,837 | 84,107 | 34,901 | 9,948 | 144,310 | 27,154 | 300,420 | 68,417 | ..... | 4,300 | 64,117 | 10,659 |
| New York Central & Hudson River | 3,751 | 17,445,756 | 10,953,085 | 31,560,165 | 4,834,252 | 5,765,721 | 617,514 | 10,719,835 | 752,639 | 22,689,961 | 8,870,204 | —16,380 | 1,611,414 | 7,242,410 | —151,399 |
| New York, Chicago & St. Louis | 566 | 2,392,416 | 515,430 | 3,012,980 | 441,528 | 501,738 | 142,656 | 1,238,496 | 53,036 | 2,377,454 | 635,526 | —5,540 | 108,000 | 521,986 | —159,745 |
| New York, Ontario & Western | 566 | 1,793,365 | 843,328 | 2,792,986 | 431,303 | 407,088 | 34,726 | 893,071 | 51,776 | 1,817,964 | 975,022 | 2,549 | 56,000 | 921,571 | —143,792 |
| New York, Philadelphia & Norfolk | 112 | 844,390 | 163,815 | 1,081,842 | 87,032 | 217,632 | 15,378 | 439,779 | 41,881 | 801,702 | 280,140 | ..... | 24,000 | 256,140 | —24,974 |
| Norfolk Southern | 569 | 474,133 | 229,644 | 782,085 | 98,360 | 117,991 | 13,997 | 249,457 | 43,115 | 522,920 | 259,165 | —350 | 27,629 | 231,186 | —13,237 |
| Oahu Ry. & Land Co. | 101 | 270,858 | 79,262 | 372,105 | 25,543 | 24,156 | 1,793 | 70,059 | 13,677 | 135,228 | 236,877 | —5,422 | 19,740 | 211,715 | 15,035 |
| Oregon-Washington Railroad & Nav. Co. | 1,914 | 3,148,649 | 1,537,812 | 5,000,044 | 744,732 | 540,836 | 170,559 | 1,588,262 | 176,180 | 3,220,569 | 1,779,475 | —16,969 | 338,905 | 1,423,601 | —381,755 |
| Pecos & Northern Texas | 482 | 428,864 | 132,721 | 594,138 | 73,795 | 111,650 | 10,423 | 179,625 | 18,854 | 393,347 | 199,791 | ..... | 21,319 | 178,472 | —1 |
| Philadelphia & Reading | 1,020 | 9,420,234 | 2,050,576 | 12,042,309 | 1,394,478 | 2,128,757 | 138,038 | 3,965,648 | 187,911 | 7,814,832 | 4,227,477 | 89,035 | 308,418 | 4,008,094 | —905,585 |
| Port Reading | 21 | 296,514 | ..... | 302,099 | 52,505 | 228 | 93 | 89,131 | 2,051 | 144,008 | 158,091 | —10,335 | 30,000 | 117,756 | —126,326 |
| St. Louis Merchants' Bridge Terminal | 9 | ..... | 1,205 | 496,011 | 127,967 | 39,779 | 2,111 | 251,718 | 17,272 | 438,847 | 57,164 | ..... | 16,800 | 40,364 | —81,446 |
| St. Louis Southwestern of Texas | 811 | 769,671 | 348,958 | 1,202,909 | 299,345 | 290,018 | 36,489 | 482,464 | 58,550 | 1,166,866 | 36,043 | —1,064 | 53,400 | —18,421 | —268,368 |
| San Pedro, Los Angeles & Salt Lake | 1,133 | 1,547,048 | 852,094 | 2,581,765 | 344,118 | 437,599 | 95,316 | 844,378 | 56,108 | 1,777,519 | 804,246 | —4,144 | 124,278 | 675,824 | —152,011 |
| Southern | 7,037 | 10,506,009 | 5,283,357 | 16,996,009 | 2,472,028 | 2,812,884 | 538,640 | 5,902,775 | 491,915 | 12,218,242 | 4,777,767 | 1,680 | 624,222 | 4,155,225 | —519,959 |
| Southern Pacific Co. | 6,329 | 14,232,690 | 8,512,037 | 24,608,191 | 2,702,367 | 3,452,051 | 476,446 | 6,674,707 | 695,630 | 14,001,201 | 10,606,990 | 447,055 | 1,203,921 | 9,850,124 | —1,843,539 |
| Spokane International | 163 | 203,216 | 74,560 | 292,364 | 51,342 | 15,859 | 5,785 | 81,487 | 10,542 | 165,015 | 127,349 | ..... | 9,062 | 118,287 | —20,777 |
| Spokane, Portland & Seattle | 556 | 773,432 | 535,565 | 1,421,550 | 186,067 | 112,026 | 27,231 | 323,402 | 38,860 | 687,586 | 733,964 | 6,913 | 160,200 | 580,677 | —24,205 |
| Terminal Railroad Ass'n of St. Louis | 34 | ..... | 700 | 728,629 | 131,824 | 64,669 | 2,694 | 265,672 | 16,204 | 481,063 | 247,566 | 17,070 | 79,900 | 184,736 | —70,914 |
| Texas & New Orleans | 458 | 682,784 | 341,302 | 1,085,311 | 191,187 | 246,743 | 23,269 | 426,351 | 38,537 | 926,087 | 159,224 | 6,752 | 67,514 | 98,462 | —51,895 |
| Texas & Pacific | 1,885 | 2,880,055 | 1,244,753 | 4,390,289 | 729,953 | 768,917 | 111,858 | 1,746,934 | 119,684 | 3,477,346 | 912,943 | 3,329 | 144,576 | 771,696 | 542,461 |
| Ulster & Delaware | 129 | 185,237 | 184,106 | 388,433 | 49,347 | 40,135 | 6,207 | 149,200 | 9,127 | 254,016 | 134,417 | —111 | 10,500 | 123,806 | —13,761 |
| Union Pacific | 3,611 | 9,633,687 | 3,162,818 | 14,046,042 | 1,600,962 | 1,795,701 | 324,593 | 3,448,347 | 371,567 | 7,541,170 | 6,504,872 | —6,739 | 512,263 | 5,985,670 | —730,619 |
| Vandalia | 910 | 2,056,918 | 709,489 | 3,085,128 | 430,809 | 563,829 | 82,717 | 1,139,369 | 59,585 | 2,276,309 | 808,819 | ..... | 90,948 | 717,871 | —38,983 |
| Virginia & Southwestern | 240 | 433,074 | 54,523 | 501,288 | 68,706 | 113,443 | 6,398 | 137,522 | 11,265 | 337,334 | 163,954 | ..... | 17,727 | 146,227 | 29,791 |
| Virginian | 503 | 1,429,508 | 116,353 | 1,588,224 | 206,820 | 272,204 | 17,283 | 351,874 | 27,788 | 875,969 | 712,255 | 22,112 | 62,195 | 672,172 | 187,154 |
| Wabash | 2,515 | 5,475,129 | 2,212,318 | 8,380,438 | 1,058,224 | 1,394,209 | 274,713 | 3,114,603 | 208,525 | 6,050,274 | 2,330,164 | —11,500 | 223,343 | 2,095,321 | —112,099 |
| Western Maryland | 661 | 1,719,150 | 405,440 | 2,221,791 | 356,496 | 302,694 | 69,103 | 914,909 | 50,590 | 1,693,792 | 527,999 | ..... | 57,000 | 470,999 | —25,486 |
| Western Pacific | 934 | 1,368,066 | 450,244 | 1,864,002 | 345,951 | 174,137 | 85,427 | 597,533 | 91,100 | 1,294,148 | 569,854 | —231 | 91,040 | 478,583 | 16,899 |

## REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF OCTOBER, 1913.

| Name of road. | Average mileage operated during period. | Operating revenues | | | Operating expenses | | | | | | Net operating revenue (or deficit). | Outside operations, net. | Taxes. | Operating income (or loss). | Increase (or decr.) comp. with last year. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Maintenance | | | | | | | | | | |
| | | Freight. | Passenger. | Total, inc. misc. | Way and structures. | Of equipment. | Traffic. | Trans-portation. | General. | Total. | | | | | |
| Alabama & Vicksburg | 143 | $118,964 | $42,421 | $173,319 | $24,186 | $33,044 | $3,801 | $56,526 | $5,690 | $123,247 | $50,072 | —$300 | $7,450 | $42,322 | —$12,130 |
| Arizona & New Mexico | 109 | 74,481 | 10,004 | 88,830 | 7,913 | 8,048 | 681 | 16,301 | 3,481 | 36,424 | 52,406 | ..... | 3,400 | 49,006 | —1,612 |
| Atlanta, Birmingham & Atlantic | 645 | 263,680 | 59,422 | 352,640 | 56,100 | 47,956 | 14,350 | 127,995 | 11,758 | 258,159 | 94,481 | ..... | 14,337 | 80,144 | 4,872 |
| Atlantic Coast Line | 4,619 | 2,173,577 | 685,652 | 3,085,875 | 420,011 | 518,668 | 47,518 | 1,040,821 | 100,908 | 2,127,926 | 957,949 | ..... | 132,000 | 825,949 | —44,242 |
| Baltimore & Ohio Chicago Terminal | 77 | ..... | 711 | 165,551 | 24,100 | 18,206 | 561 | 72,938 | 5,515 | 121,320 | 44,231 | 790 | 16,052 | 28,969 | 2,315 |
| Bessemer & Lake Erie | 204 | 950,497 | 29,143 | 992,495 | 84,997 | 185,439 | 16,665 | 232,701 | 12,439 | 532,241 | 460,254 | ..... | 38,000 | 422,254 | —105,279 |
| Birmingham Southern | 43 | 63,433 | 1,021 | 105,377 | 18,416 | 11,540 | 427 | 35,243 | 3,987 | 69,613 | 35,764 | ..... | 1,805 | 33,959 | —3,921 |
| Boston & Maine | 2,252 | 2,641,347 | 1,380,098 | 4,351,379 | 674,966 | 655,902 | 35,136 | 1,898,664 | 101,556 | 3,336,224 | 985,155 | 6,547 | 154,521 | 837,181 | —180,628 |
| Buffalo & Susquehanna *Railroad* | 253 | 164,861 | 7,935 | 176,758 | 32,376 | 24,717 | 3,400 | 55,486 | 8,202 | 124,181 | 52,577 | ..... | 2,200 | 50,377 | —803 |
| Buffalo & Susquehanna *Ry.* | 91 | 40,576 | 8,342 | 51,952 | 13,422 | 29,496 | 1,055 | 22,527 | 4,454 | 70,954 | —19,002 | —19 | 1,600 | —20,621 | —10,481 |
| Buffalo, Rochester & Pittsburgh | 576 | 1,007,681 | 97,188 | 1,140,411 | 157,819 | 229,953 | 17,574 | 361,950 | 18,314 | 785,610 | 354,801 | —286 | 18,000 | 336,515 | 33,897 |
| Carolina, Clinchfield & Ohio | 248 | 219,121 | 17,822 | 241,046 | 17,617 | 29,017 | 6,237 | 41,406 | 8,412 | 102,689 | 138,357 | ..... | 9,250 | 129,107 | 3,259 |
| Carolina, Clinch. & Ohio Ry. Co. of S. C. | 18 | 12,405 | 2,219 | 14,844 | 641 | 85 | 1,874 | 2,634 | 396 | 5,630 | 9,214 | ..... | 750 | 8,464 | —468 |
| Central of New Jersey | 676 | 1,989,318 | 458,468 | 2,537,080 | 278,476 | 409,890 | 32,095 | 755,407 | 43,687 | 1,519,555 | 1,017,525 | —32,000 | 114,657 | 870,868 | —367,058 |
| Charleston & Western Carolina | 341 | 173,241 | 34,012 | 215,393 | 33,709 | 31,087 | 3,412 | 67,962 | 5,268 | 141,438 | 73,955 | ..... | 5,000 | 68,955 | 22,279 |
| Chicago & Alton | 1,032 | 884,136 | 400,024 | 1,385,646 | 191,755 | 479,400 | 45,886 | 530,229 | 36,346 | 1,283,616 | 102,030 | —3,071 | 40,600 | 58,359 | —416,677 |
| Chicago & Eastern Illinois | 1,282 | 1,123,825 | 247,584 | 1,483,235 | 259,453 | 395,069 | 21,631 | 547,836 | 39,168 | 1,263,157 | 220,078 | —3,073 | 45,000 | 172,005 | —196,790 |
| Chicago & Northwestern | 8,091 | 5,673,175 | 1,947,319 | 8,359,642 | 1,088,725 | 1,183,101 | 115,391 | 2,906,630 | 150,225 | 5,444,072 | 2,915,570 | 4,635 | 320,000 | 2,600,205 | —68,222 |
| Chicago, Burlington & Quincy | 9,129 | 6,608,690 | 2,077,458 | 9,482,484 | 965,531 | 1,476,232 | 130,787 | 2,859,314 | 197,455 | 5,629,319 | 3,853,165 | —15,608 | 304,309 | 3,533,248 | —176,936 |
| Chicago Junction | 12 | ..... | ..... | 195,226 | 24,270 | 9,760 | 1,963 | 101,669 | 3,745 | 141,407 | 53,819 | ..... | 2,515 | 51,304 | —10,489 |
| Chicago, Rock Island & Gulf | 477 | 211,678 | 59,952 | 290,642 | 25,589 | 30,761 | 9,695 | 110,262 | 7,755 | 184,062 | 106,580 | —747 | 11,376 | 94,457 | —51,620 |
| Chicago, Rock Island & Pacific | 7,525 | 4,183,058 | 1,614,183 | 6,174,361 | 708,450 | 797,876 | 158,248 | 2,347,763 | 156,674 | 4,169,011 | 2,005,350 | —13,150 | 286,322 | 1,705,878 | —232,846 |
| Chicago, St. Paul, Minneapolis & Omaha | 1,747 | 1,228,265 | 489,892 | 1,824,389 | 249,355 | 201,817 | 27,045 | 678,183 | 36,899 | 1,193,299 | 631,090 | 1,606 | 86,582 | 546,114 | —61,805 |
| Chicago, Terre Haute & Southeastern | 362 | 208,610 | 16,840 | 230,915 | 37,628 | 63,257 | 6,495 | 70,788 | 10,650 | 188,818 | 42,097 | —251 | 11,500 | 30,346 | —14,138 |
| Cincinnati, Hamilton & Dayton | 1,015 | 744,056 | 153,259 | 999,512 | 147,006 | 169,334 | 28,484 | 436,651 | 19,741 | 801,216 | 198,296 | ..... | 34,713 | 163,583 | —102,682 |
| Colorado Midland | 338 | 160,193 | 21,504 | 195,636 | 40,056 | 37,358 | 8,870 | 84,654 | 5,533 | 176,471 | 19,165 | —352 | 8,000 | 10,813 | —39,936 |
| Cumberland Valley | 162 | 240,104 | 66,828 | 321,076 | 72,274 | 36,864 | 5,835 | 105,001 | 7,668 | 227,642 | 93,434 | 248 | 5,702 | 87,980 | —31,895 |
| Delaware & Hudson Co.—Railroad Dept. | 854 | 1,768,589 | 272,763 | 2,115,534 | 162,642 | 324,707 | 32,563 | 723,508 | 67,836 | 1,311,256 | 804,278 | —2,136 | 49,700 | 752,442 | 971 |
| Delaware, Lackawanna & Western | 960 | 2,729,415 | 724,928 | 3,746,633 | 411,081 | 548,701 | 85,731 | 1,093,354 | 64,465 | 2,203,332 | 1,543,301 | 82,993 | 165,000 | 1,461,294 | —95,149 |
| Detroit & Mackinac | 411 | 80,074 | 27,348 | 114,708 | 12,930 | 19,202 | 3,657 | 36,276 | 2,735 | 74,790 | 39,918 | —402 | 8,380 | 31,136 | 3,967 |
| Duluth & Iron Range | 272 | 843,628 | 24,959 | 882,851 | 97,151 | 82,070 | 1,006 | 186,951 | 11,404 | 378,582 | 504,269 | 543 | 48,202 | 456,610 | —109,975 |
| Duluth, Missabe & Northern | 356 | 1,034,323 | 31,780 | 1,076,082 | 93,916 | 97,776 | 2,263 | 208,298 | 13,201 | 415,454 | 660,628 | 4,370 | 58,201 | 606,797 | —142,078 |
| El Paso & Southwestern Co | 982 | 663,546 | 94,234 | 791,186 | 146,936 | 104,034 | 15,884 | 209,034 | 27,305 | 503,193 | 287,993 | —1,568 | 45,000 | 241,425 | —127,136 |
| Elgin, Joliet & Eastern | 804 | 1,055,003 | 6 | 1,127,865 | 177,583 | 224,118 | 9,310 | 327,012 | 17,318 | 755,341 | 372,524 | ..... | 35,112 | 337,412 | —198,165 |
| Florence & Cripple Creek | 87 | 93,175 | 14,024 | 109,675 | 16,855 | 11,740 | 2,047 | 28,784 | 4,167 | 63,593 | 46,082 | ..... | 2,426 | 43,656 | —1,975 |
| Grand Rapids & Indiana | 578 | 311,829 | 146,667 | 500,639 | 69,337 | 79,412 | 18,834 | 202,135 | 15,707 | 385,425 | 115,214 | —1,531 | 24,746 | 88,937 | —15,005 |
| Gulf & Ship Island | 308 | 137,724 | 32,763 | 182,837 | 21,103 | 38,916 | 2,827 | 47,468 | 8,531 | 118,845 | 63,992 | ..... | 6,878 | 57,114 | 8,696 |
| Illinois Central | 4,763 | 4,146,990 | 1,211,527 | 6,070,438 | 925,500 | 1,340,403 | 107,808 | 2,103,353 | 129,451 | 4,606,515 | 1,463,923 | —3,930 | 264,000 | 1,195,993 | 15,995 |
| Kansas City Southern | 827 | 692,950 | 133,650 | 924,972 | 96,561 | 108,166 | 26,845 | 309,338 | 36,485 | 577,395 | 347,577 | ..... | 40,013 | 307,564 | —47,213 |
| Lehigh Valley | 1,438 | 3,345,127 | 396,473 | 3,875,426 | 430,701 | 745,880 | 79,111 | 1,251,542 | 69,180 | 2,576,414 | 1,299,012 | —790 | 121,000 | 1,177,222 | —43,182 |
| Long Island | 399 | 323,627 | 548,393 | 985,602 | 133,790 | 118,430 | 14,035 | 495,828 | 26,130 | 788,213 | 197,389 | —1,203 | 63,660 | 132,526 | —120,946 |
| Louisiana & Arkansas | 279 | 118,032 | 21,615 | 144,793 | 22,589 | 22,394 | 2,529 | 39,577 | 5,711 | 95,800 | 48,993 | ..... | 4,166 | 44,827 | 13,095 |
| Louisville & Nashville | 4,923 | 4,327,673 | 1,154,659 | 5,831,253 | 786,952 | 1,074,730 | 103,808 | 1,811,631 | 102,111 | 3,879,232 | 1,952,021 | —300 | 150,609 | 1,801,112 | 322,186 |
| Maine Central | 1,207 | 696,799 | 295,241 | 1,057,718 | 184,702 | 181,523 | 13,216 | 387,672 | 26,494 | 793,606 | 264,112 | —4,785 | 47,996 | 211,331 | —71,582 |
| Missouri & North Arkansas | 365 | 76,023 | 34,801 | 117,068 | 25,135 | 20,342 | 3,978 | 41,634 | 5,114 | 96,203 | 20,865 | ..... | 5,500 | 15,365 | 15,299 |
| Missouri, Okla. & Gulf Ry. Co. of Texas | 19 | 12,088 | 695 | 12,892 | 913 | 2,149 | 172 | 5,727 | 912 | 10,073 | 2,819 | ..... | 171 | 2,648 | 3,988 |
| Mobile & Ohio | 1,122 | 995,278 | 137,926 | 1,201,064 | 132,129 | 240,123 | 42,556 | 425,996 | 32,549 | 873,353 | 327,711 | —2,111 | 33,888 | 291,712 | —36,360 |
| Monongahela | 67 | 134,182 | 2,757 | 139,156 | 17,421 | 7,436 | 461 | 27,741 | 2,153 | 55,212 | 83,944 | ..... | 2,350 | 81,594 | —12,201 |
| Monongahela Connecting | 6 | ..... | ..... | 92,701 | 8,919 | 18,782 | 300 | 39,866 | 2,453 | 70,320 | 22,381 | ..... | 2,783 | 19,598 | —12,108 |
| New Orleans & North Eastern | 196 | 272,768 | 53,656 | 348,248 | 33,278 | 75,038 | 10,689 | 127,314 | 12,097 | 258,416 | 89,832 | —206 | 15,800 | 73,826 | —8,811 |
| New Orleans, Mobile & Chicago | 403 | 157,407 | 31,635 | 201,271 | 23,622 | 23,158 | 4,025 | 59,593 | 7,891 | 118,289 | 82,982 | —85 | 7,197 | 75,700 | —5,780 |
| New Orleans, Texas & Mexico | 286 | 92,842 | 16,653 | 118,222 | 40,813 | 11,132 | 2,441 | 55,031 | 10,675 | 120,092 | —1,870 | ..... | 1,434 | —3,304 | —31,069 |
| New York, Philadelphia & Norfolk | 112 | 251,017 | 43,736 | 315,088 | 28,792 | 73,572 | 5,547 | 144,656 | 13,785 | 266,352 | 48,736 | ..... | 8,000 | 40,736 | —22,504 |
| Northern Central | 472 | 927,016 | 229,748 | 1,242,781 | 161,081 | 290,217 | 24,689 | 593,908 | 25,727 | 1,095,622 | 147,159 | 1,390 | 48,069 | 100,480 | —98,973 |
| Northern Pacific | 6,313 | 5,552,253 | 1,456,589 | 7,423,031 | 970,123 | 842,083 | 115,400 | 2,113,537 | 83,661 | 4,124,804 | 3,298,227 | 41,438 | 374,595 | 2,965,070 | —378,344 |
| Northwestern Pacific | 401 | 161,474 | 159,146 | 343,534 | 59,186 | 44,378 | 3,498 | 119,745 | 11,831 | 238,638 | 104,896 | ..... | 15,100 | 89,796 | —16,492 |
| Pennsylvania *Co.* | 1,751 | 4,692,755 | 865,423 | 6,130,960 | 886,283 | 1,192,592 | 84,165 | 2,213,111 | 104,625 | 4,480,776 | 1,650,184 | —8,835 | 260,603 | 1,380,746 | —521,743 |
| Pennsylvania *Railroad* | 4,032 | 12,422,516 | 3,328,211 | 16,941,246 | 2,099,566 | 3,615,969 | 272,216 | 6,069,640 | 356,114 | 12,413,505 | 4,527,741 | —186,242 | 670,290 | 3,671,209 | —656,627 |
| Philadelphia, Baltimore & Washington | 713 | 914,275 | 730,937 | 1,851,749 | 308,032 | 347,313 | 43,556 | 791,292 | 42,139 | 1,532,332 | 319,417 | ..... | 57,351 | 262,066 | —132,034 |
| Pittsburgh, Cincinnati Chic. & St. Louis | 1,472 | 2,946,984 | 775,270 | 4,165,538 | 656,744 | 850,519 | 71,296 | 1,556,051 | 75,000 | 3,209,610 | 955,928 | —2,032 | 159,522 | 794,374 | —332,249 |
| Rutland | 468 | 182,941 | 117,325 | 347,845 | 35,139 | 74,068 | 11,319 | 125,610 | 5,921 | 252,057 | 95,788 | 365 | 17,095 | 79,058 | —14,827 |
| San Antonio & Aransas Pass | 724 | 311,032 | 112,454 | 447,351 | 75,139 | 65,269 | 7,437 | 184,630 | 11,714 | 344,189 | 103,162 | ..... | 12,000 | 91,162 | —148,143 |
| Southern in Mississippi | 281 | 81,247 | 37,430 | 129,146 | 24,629 | 11,223 | 2,529 | 49,904 | 3,862 | 92,147 | 36,999 | ..... | 6,812 | 30,187 | —2,468 |
| Tennessee Central | 294 | 108,814 | 42,902 | 159,638 | 32,153 | 16,592 | 5,349 | 54,716 | 7,507 | 116,317 | 43,321 | ..... | 4,246 | 39,075 | 803 |
| Toledo, Peoria & Western | 248 | 82,414 | 43,683 | 138,670 | 25,722 | 31,275 | 2,807 | 54,439 | 3,659 | 117,902 | 20,768 | ..... | 5,000 | 15,768 | —24,079 |
| Union Pacific | 3,612 | 4,340,495 | 1,064,770 | 5,837,467 | 521,707 | 672,026 | 111,340 | 1,340,833 | 122,341 | 2,768,247 | 3,069,220 | —6,166 | 199,088 | 2,863,966 | 189,335 |
| Union R. R. of Baltimore | 9 | 124,290 | 24,836 | 151,741 | 14,669 | ..... | 1,230 | 5,975 | 2,391 | 24,265 | 127,476 | ..... | 6,494 | 120,982 | —348 |
| Union R. R. of Pennsylvania | 31 | ..... | ..... | 476,606 | 55,113 | 114,660 | 100 | 181,381 | 3,340 | 354,594 | 122,012 | 734 | 11,000 | 111,746 | —77,348 |
| Vandalia | 910 | 769,854 | 227,152 | 1,107,791 | 138,460 | 215,903 | 27,480 | 412,991 | 20,081 | 814,915 | 292,876 | ..... | 30,316 | 262,560 | —75,390 |
| West Jersey & Seashore | 356 | 167,436 | 262,660 | 469,626 | 88,757 | 110,286 | 20,271 | 227,758 | 12,981 | 460,053 | 9,573 | —2,986 | 27,859 | —21,272 | —72,726 |
| Wheeling & Lake Erie | 459 | 757,621 | 54,531 | 857,288 | 108,672 | 140,423 | 8,716 | 256,093 | 18,384 | 532,288 | 325,000 | 50 | 33,431 | 291,619 | 8,503 |
| Yazoo & Mississippi Valley | 1,372 | 899,329 | 230,318 | 1,208,890 | 166,532 | 169,849 | 15,138 | 400,488 | 25,748 | 777,755 | 431,135 | —1,207 | 43,000 | 387,928 | 105,459 |

York lighterage district. In order to entitle its shipments to the rebate, it was asserted, the Federal Refinery brought its lighters within the New York area, tied up at a dock, and then continued the journey to the freight station. The defendant railroads claimed that the lighterage allowance demanded by the Federal Company and granted by the Interstate Commerce Commission was in itself excessive. The decision sets aside the order of the commission which brought Yonkers within the lighterage district of New York.

The Supreme Court of the United States has upheld a decree of the Circuit Court for the eastern district of Kentucky which had denied a petition of the Louisville & Nashville to have an order made by the Kentucky Railroad Commission set aside. The railroad had attacked the validity of the law under which the commission had acted. The order to which the railroad objected had restored certain rules formerly in effect as to special shipments by distillers. Prior to the order the L. & N. had departed from these rates and put into effect an increase. In restoring the original rates the state commission provided that they should be enjoyed not only by the distillers and other special shippers who had enjoyed the benefit of them, but that they should be made available to the public generally. Justice Hughes delivered the opinion. The fixing of rates is declared to be a legislative and not a judicial function and as to the validity of the state law, he reiterated the policy of the Supreme Court not to pass on the validity of a state law until after it had been tested in the highest court of the state.

### Tap Line Order Overruled.

The United States Commerce Court on November 26 decided against the Interstate Commerce Commission in the so called tap-line cases, holding that the distinctions made by the commission between transportation of property belonging to the tap line's own mills and that belonging to other mills, and the commission's prescribing distances to which the tap line special privileges should be limited are arbitrary, and beyond the power of the commission. The cases are those of the Louisiana & Pacific, the Woodworth & Louisiana Central, the Mansfield Railway & Transportation and the Victoria, Fisher & Western. A similar opinion was handed down in the case of the Butler County Railroad. All of the decisions were by Judge Mack.

It is held that the commission was without power to forbid an allowance to be made by trunk lines to the petitioning proprietary industries for switching, and it was also without power to prohibit the making of joint rates by the trunk lines and the petitioning tap lines and the payment by the former to the latter of some division thereof for its services. The commission, however, has power to regulate the amount of allowances where unjust discrimination or illegal favoritism may be found.

The complaint filed with the commission to secure an order compelling the re-establishment of through routes and joint rates, which was dismissed by the commission, is not considered by the court, it being held that a negative order like this does not come within the jurisdiction of the court.

### Mileage Tickets in Georgia.

The Supreme Court of Georgia has sustained the railroad commission of that state in its order, requiring railroads to accept mileage coupons on trains, thereby denying the claim of the railroads to the right to enforce a rule requiring the coupons to be delivered at the station ticket office at the beginning of each journey, and exchanged for a trip ticket. The case will probably be carried up to the Supreme Court of the United States. Justice Beck dissented. The original order passed by the railroad commission was signed by only three of the five commissioners, two voting against it.

It will be recalled that the Interstate Commerce Commission recently decided that, as regards interstate journeys, the rule requiring coupons to be exchanged at the station office, was not unreasonable.

It is said that the railroads of Georgia will now refuse to sell interchangeable mileage books, and traveling men will be obliged to buy separate books on each road. The railroads took action like this in South Carolina when a similar order was put in force in that state.

# Railway Officers.

### Executive, Financial and Legal Officers.

Oscar Lawler has been elected auditor of the San Pedro, Los Angeles & Salt Lake, with headquarters at Los Angeles, Cal., succeeding H. I. Bettis, deceased.

The election of Fairfax Harrison, president of the Chicago, Indianapolis & Louisville, as president of the Southern Railway, succeeding W. W. Finley, deceased, is commented on elsewhere in this issue.

John C. Bills has been appointed assistant general solicitor of the Pere Marquette, with office at Detroit, Mich., and Parker, Shields & Brown succeed the firm of Bills, Parker, Shields & Brown as general attorneys, with offices at Detroit.

F. C. Uhlman, assistant general auditor of the Western Maryland, has been appointed general auditor, succeeding Robert Casson, who will take up important work in connection with the valuation of all properties of the Western Maryland made necessary by the bill recently passed by congress.

### Operating Officers.

J. S. Denham, car accountant of the Georgia & Florida at Augusta, Ga., having resigned, T. D. Simmons has been appointed acting car accountant, with office at Augusta.

Webb C. Ball has been appointed general time inspector of the New York, New Haven & Hartford and the Central New England, with headquarters at New Haven, Conn.

T. S. Mahoney, trainmaster of the Texas & Pacific at New Orleans, La., has been appointed superintendent of terminals at New Orleans, La., succeeding P. L. Wing, transferred.

William H. Corbett has been appointed trainmaster of the Minnesota division of the Minneapolis, St. Paul & Sault Ste. Marie, succeeding A. W. Shepherd, assigned to other duties.

Charles W. Brown, engineer maintenance of way of the Lehigh & New England at South Bethlehem, Pa., has been appointed assistant superintendent, with office at South Bethlehem.

B. C. Byers, superintendent of the Peoria & Eastern division of the Cleveland, Cincinnati, Chicago & St. Louis, at Indianapolis, Ind., has been transferred to the superintendency of the Cairo division, with headquarters at Mt. Carmel, Ill., succeeding P. J. Maloney, resigned.

Joseph H. Gumbes, assistant superintendent of the Pittsburgh division of the Pennsylvania Railroad at Youngwood, Pa., has been appointed superintendent of the Renova division, with headquarters at Renova, succeeding W. G. Coughlin, promoted, and John M. James, superintendent of motive power of the Western Pennsylvania division at Pittsburgh succeeds Mr. Gumbes.

James S. Moore, whose appointment as assistant superintendent of the Virginian Railway, with headquarters at Victoria, Va., has been announced in these columns, was born on October 15, 1868, in Edgecombe county, N. C. He was educated in the common schools of North Carolina, and in the summer of 1886 began railway work as a telegraph operator on the Atlantic Coast Line. Four years later he entered the service of the Richmond & Danville as an operator, and a few months later was promoted to train despatcher. In 1892, he was appointed despatcher on the Georgia, Southern & Florida, at Macon Ga., and in 1900, went to the Seaboard Air Line as train despatcher, at Richmond, Va., remaining in that position until the summer of 1906. The following year he was appointed train despatcher on the Virginian Railway, and in 1908, was promoted to chief despatcher, which position he held at the time of his recent appointment as assistant superintendent of the same road, as above noted.

### Traffic Officers.

D. U. Wilder has been appointed traveling passenger agent of the Louisville & Nashville with headquarters at Jacksonville, Fla.

H. T. Mason has been appointed mail traffic manager of the St. Louis & San Francisco, with office at St. Louis, Mo., succeeding Guy Adams, resigned.

R. G. Hanson, Jr., agent in the land and industrial department of the Southern Railway at Bristol, Tenn., has been appointed industrial agent of the Missouri, Kansas & Texas, with headquarters at St. Louis, Mo.

R. C. Weller has been appointed industrial agent of the Lake Shore & Michigan Southern, Pittsburgh & Lake Erie and Lake Erie & Western, with headquarters at Cleveland, O., in place of H. J. Perkins, who has been appointed industrial agent of the Michigan Central at Detroit. Mr. Perkins succeeds W. S. Crowl, appointed general agent at Detroit.

Charles D. Fisher, city passenger and ticket agent of the Chicago Great Western, at Minneapolis, Minn., has been appointed assistant general passenger agent, with headquarters at Minneapolis. F. R. Thomas succeeds Mr. Fisher. J. E. Boggs has been appointed city passenger and ticket agent at St. Paul, Minn., succeeding M. F. Montgomery, resigned, to engage in other business.

### Engineering and Rolling Stock Officers.

Charles Bowersox, general foreman of the Toledo & Ohio Central at Bucyrus, O., has been appointed master mechanic at that point.

William J. Calvin has been appointed roadmaster of the Northern Pacific at Sedro-Wooley, Wash., in place of William H. Gale, resigned.

W. C. Hattan has been appointed division engineer of the Elkhorn extension of the Carolina, Clinchfield & Ohio, with headquarters at Dante, Va.

J. V. B. Duer, foreman of motormen of the Manhattan division of the Pennsylvania Railroad at New York, has been appointed assistant engineer, with headquarters at Altoona, Pa., succeeding B. F. Wood, resigned.

Robert F. Byers, formerly shop foreman of the National Railways of Mexico, at Aguascalientes, Mex., has been appointed master mechanic of the Central Dominicano Railway, with headquarters at Porto Plata, Dominican Republic.

C. F. Stoltz has been appointed signal engineer of the Cleveland, Cincinnati, Chicago & St. Louis and the Peoria & Eastern, with headquarters at Cincinnati, Ohio, succeeding L. S. Rose, assigned to other duties in connection with valuation work.

F. W. Gilcreast, chief engineer of the Lehigh & New England, at Mauch Chunk, Pa., has been appointed engineer maintenance of way, with office at South Bethlehem, Pa., succeeding Charles W. Brown, promoted, and his former position has been abolished.

W. G. Coughlin, superintendent of the Renovo division of the Pennsylvania Railroad at Renovo, Pa., has been appointed engineer of maintenance of way with headquarters at Philadelphia, succeeding L. R. Zollinger, deceased. J. M. Henry, master mechanic of the West Philadelphia shops, has been appointed superintendent of motive power at Pittsburgh, succeeding J. M. James, promoted.

G. C. Cleaver, division engineer of the Buffalo, Rochester & Pittsburgh, at Du Bois, Pa., has been promoted to engineer maintenance of way, with headquarters at Rochester, N. Y. E. W. Hammond, division engineer at Rochester, has been promoted to division engineer in charge of Divisions 3, 4 and 5, with headquarters at Du Bois, and J. P. Reynolds has been promoted to division engineer of Divisions 1, 2 and Erie division, with headquarters at Rochester.

## OBITUARY.

James Hagerman, formerly general counsel of the Missouri, Kansas & Texas, died in St. Louis, Mo., November 14, aged 65 years. Mr. Hagerman had been connected with the Missouri, Kansas & Texas since 1888, when he was made general counsel for the receivers of that company. When the company was reorganized in 1891 he was appointed general solicitor of the reorganized system, and in 1904 he was made general counsel, which position he resigned in June, 1912, owing to ill health, when he was made consulting counsel.

# Equipment and Supplies.

## LOCOMOTIVE BUILDING.

THE KANAWHA & MICHIGAN has ordered seven consolidation locomotives from the American Locomotive Company.

THE BROOKLYN RAPID TRANSIT COMPANY, Brooklyn, N. Y., has ordered two 55-ton electric locomotives for switching and light freight service from the General Electric Company.

THE WESTERN MARYLAND has ordered 20 consolidation locomotives from the American Locomotive Company and 5 or 6 switching locomotives from the Baldwin Locomotive Works.

## CAR BUILDING.

THE MINNEAPOLIS & ST. LOUIS has ordered 500 box cars from Haskell & Barker.

THE CHICAGO GREAT WESTERN has ordered 6 coaches from the American Car & Foundry Company.

THE STANDARD OIL COMPANY is said to be inquiring for 6 or 7 special coke cars. This item has not been confirmed.

THE ARMOUR CAR LINES are said to be building from 400 to 500 refrigerator cars. This item has not been confirmed.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has ordered 6 coaches, 2 parlor cars and 2 buffet observation cars from the Barney & Smith Car Company.

THE LEHIGH VALLEY has ordered 1,000 50-ton, all steel coal cars from the Standard Steel Car Company, and 40 steel underframe caboose cars from the company shops. The company is also having 500 coal cars rebuilt by the Middletown Car Company at Middletown, Pa., and 500 box cars by the American Car & Foundry Company at Bloomsburg, Pa.

THE LOUISVILLE & NASHVILLE has bought 800 steel underframes from the Mt. Vernon Car & Manufacturing Company, and 300 steel underframes from the American Car & Foundry Company.

THE EAST BROAD TOP RAILROAD & COAL COMPANY has ordered 30 narrow-gage, steep hopper cars from the Pressed Steel Car Company. These cars will be similar to those described in the *Railway Age Gazette* of June 27, 1913, page 1606; except that they will have an additional length of 2½ ft. and 3,600 lbs. increased capacity. They will be equipped with Vulcan trucks and cast steel truck bolsters.

## IRON AND STEEL.

THE ILLINOIS CENTRAL has ordered 264 tons of steel for a bascule bridge at Galena, Ill., from the American Bridge Company.

THE CHICAGO & EASTERN ILLINOIS has ordered 300 tons of steel from the Morava Construction Company for its shops at Danville, Ill.

## SIGNALING.

The Philadelphia & Reading has awarded to the Federal Signal Company a contract for an electric interlocking plant at Newtown Junction, near Philadelphia. The machine will have 40 levers.

The Duluth, Winnipeg & Pacific has contracted with the Federal Signal Company for a 36-lever mechanical interlocking plant at the connection of its line with the Northern Pacific, at West Duluth, Minn. The home signals will be type "4" top post, and distant signals will be type "4A" bottom post, motor signals. The Federal Signal Company has been awarded the contract for material for a 36-lever mechanical interlocking plant to be installed by the Louisville & Nashville, at the crossing of the Alton and Southern, near East St. Louis, Ill. The home and distant signals will be motor-operated type "4A" bottom post mechanism.

# Supply Trade News.

The Phoenix Bridge Company, Phoenixville, Pa., has discontinued its New Orleans, La., branch office and established in its stead an office in the Hurt building at Atlanta, Ga.

The Canadian H. W. Johns-Manville Co., Limited, has moved its Toronto branch to No. 19 Front street, East. The new store and warehouse has a floor area of approximately 35,000 sq. ft. and is situated in the heart of the wholesale district.

The Edison Storage Battery Company, Orange, N. J., has nearly completed its new Orange plant. It is expected that all the new machinery will be received and arranged by the latter part of December, and that an addition of nearly 2,000 new employees will be required to operate it.

The Westinghouse, Church & Kerr Company, of New York, has entered suit in the United States Court at Boston, against the Grand Trunk Railway, alleging breach of contract in connection with the preparations for the construction of a new station at Toronto. The complaint sets forth that plaintiffs have been damaged $1,000,000 through the railroad company's breach of contract.

The General Electric Company, Schenectady, N. Y., has received among recent orders the following: 55 electro-pneumatic air brake equipments and 101 emergency straight air brake equipments with CP-27 compressors, ordered by the Boston Elevated Boston, Mass.; eight GE-66, 125 h. p. two-motor, car equipments, ordered by the Northwestern Pacific; and one 40-ton electric switching locomotive of standard construction provided with Sprague-General Electric type M control, geared for slow speed and equipped with four GE-207, 165 a. c., commutating pole motors for operation at 600 v., ordered by the Albany Southern. An order from the Brooklyn Rapid Transit Company is mentioned under Equipment and Supplies.

## TRADE PUBLICATIONS.

Electric Welders and Grinders.—The Indianapolis Switch & Frog Company, Springfield, Ohio, has issued a leaflet describing the Indianapolis portable electric welders and grinders.

Belt Shifters.—The R. K. LeBlond Machine Tool Company, Cincinnati, Ohio, has issued a booklet entitled, "Safety Commercialized," which is devoted to the LeBlond patent belt shifter.

Drinking Cups.—The Sanitary Fountain & Vending Machine Company, Pittsburgh, Pa., has issued a six page leaflet describing its collapsible board drinking cups and line of coin operated drinking cup machines.

Steel Axles.—The Illinois Steel Company, Chicago, Ill., has issued a booklet containing standard dimensions of forged steel axles and the standard specifications relating thereto of the Master Car Builders' Association and those of the company itself.

Hoisting Machinery.—The Brown Hoisting Machinery Company, Cleveland, Ohio, has issued Catalogue E of its "Brownhoist" buckets and tubs, describing and illustrating grab buckets, slag buckets, contractors' grab buckets, shovel buckets and various kinds of tubs.

Portable Acetylene Lights.—The Alexander-Milburn Company, Baltimore, Md., has published a 48 page catalog, describing and illustrating the Milburn portable acetylene lights. The book shows the use for which each light is intended. List prices also are included.

Fuel Oil Systems.—The Gilbert & Barker Manufacturing Company, Springfield, Mass., has issued a catalog, in which it aims to show that by means of its process for burning fuel oil under low pressure, as great efficiency can be obtained as with the use of gas, but at a much lower cost.

Tool Steels.—E. S. Jackman & Co., Chicago, have published an 80-page booklet devoted to Blue Chip high-speed steel and other tool steels made by the Firth-Sterling Steel Company, McKeesport, Pa., for which they act as agents. The book shows the use for which each grade of steel is intended and contains list prices.

Louisville & Nashville.—The passenger department of this company has published a small, illustrated booklet, entitled, Other Things We Do, which is devoted largely to a brief account of how this railroad builds its own motive power and rolling stock. The illustrations show the various stages of the construction of a locomotive.

Car Lighting Fixtures.—The Dayton Manufacturing Company, Dayton, Ohio, in its catalog No. 166, entitled Dayton Car Lighting Fixtures, aims to give one a very complete idea of its line of chandeliers, brackets, etc., for electric, gas and oil systems of lighting. The catalog, which contains over 150 pages, is bound in cloth, and very fully illustrated.

Three-Phase Induction Motor Panels.—The General Electric Company, Schenectady, N. Y., has just issued bulletin No. A4178, describing its three-phase induction motor panels intended for induction motors of voltages of from 110 to 2,200, and for operation on 25 to 60 cycle circuits. The panels described are single panels only, and not intended to be assembled as parts of a switchboard.

Waterproofing Paste.—The Trus-Con Laboratories, Detroit, Mich., have issued a pamphlet giving the results of tests of Trus-Con Waterproofing Paste Concentrated, made at the Royal Testing Laboratories at Berlin, Germany. The results of these severe tests showed that the specimens remained impermeable and the undersides remained dry. The original report of the laboratory is reproduced in full in this bulletin.

Concrete Highway and Street Pavements.—The Universal Portland Cement Company, Chicago, has issued three pamphlets containing specifications for the construction of one-course concrete highways, one-course concrete street pavements and two-course concrete street pavements. These specifications are the result of several years of careful investigation and study of the best type of construction, and embody important points which experience has shown essential to obtaining first class concrete pavements.

Automatic Signals.—The Union Switch & Signal Company, Swissvale, Pa., has devoted bulletin No. 67 to a discussion of its style T-2 automatic block signal. The booklet, which is well illustrated and attractive in appearance, explains the mechanism of the signal, which is of the universal type, in which each semaphore arm is operated by an independent mechanism for all aspects and positions, and is so designed that with slight changes, either direct or alternating current can be used. The illustrations are meant to give one an idea of the several parts of the signal and to explain the proper wiring of its circuits.

Titanium Alloy in Open Hearth Rails.—The Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has issued bulletin No. 3 of its series of rail reports. This bulletin is prepared in the same excellent manner that characterizes bulletins Nos. 1 and 2, reviewed in the *Railway Age Gazette* of August 1, page 210, and October 10, page 678. This latest bulletin gives detailed results of a series of seven sets of standard and Titanium treated open hearth rails from which it is observed that the average results of the tensile tests show a much better ductility for the rails treated with Titanium alloy, especially in the heads, and also a slightly increased strength. The impact tests show an average increase of shock resistance of the Titanium treated steel of about 50 per cent. over that of the untreated, while endurance tests indicate that the treated rails are less easily fractured by fatigue or by constantly repeated stresses. Likewise, chemical analyses confirm the claims for Titanium by revealing a greater uniformity in the metal in the treated than in the untreated rails. Several sulphur prints and etched sections, as well as photomicrographs are given, furnishing an instructive comparison from which a reader may draw his own conclusions.

Railways of Salvador.—The Republic of Salvador, with an area of approximately that of the state of New Jersey and with a population estimated at 1,700,000, has 138 miles of railway in operation, all narrow gage and single track.

# Railway Construction.

BARCLAY & RIVERTON.—Incorporated in Illinois with $10,000 capital, to build from the mine of the Barclay Coal Company, east of Springfield, Ill., to a point about one mile east of Riverton, connecting there with the line of the Illinois Traction System. The incorporators include J. W. Black, G. F. Stericker, P. G. Matheny, J. W. Moore and C. A. Lambert, all of Springfield.

CANADIAN ROADS.—The Saskatchewan government is being asked to incorporate a company with a capital of $1,000,000, to build a railway in the provinces of Saskatchewan, Canada. The plans call for building from Regina, Sask., southeasterly to the east boundary of the province, between townships 4, 5 and 6; from Regina northwesterly to townships 27, 28 or 29, ranges 4, 5 or 6, west third meridian, and thence northerly to Saskatoon; from Regina northerly to Prince Albert, and from Saskatoon northeasterly to the east boundary of the province between townships 52, 53 and 54. J. D. McArthur, railway contractor, Winnipeg, Man., is chiefly interested in the project.

CEDAR RAPIDS & IOWA CITY.—An officer writes that the company is building with its own forces, an extension from Mt. Vernon, Iowa, to Lisbon, two miles.

CENTRAL PACIFIC.—See Southern Pacific.

CHERRY RIVER & SOUTHERN.—Incorporated in West Virginia to build from the junction of the Cranberry and Gauley rivers to Ronceverte, Greenbrier county, W. Va., through a lumber region. S. W. Richey, Cincinnati, Ohio, H. L. Kirtley, G. McClintic and W. G. Mathews, Charleston, W. Va., and A. Bringardner, Columbus, Ohio, are incorporators.

CHICAGO, MILWAUKEE & ST. PAUL.—An officer writes that work is now under way by Guthrie, McDougall & Company, Portland, Oregon, and the Keasal Construction Company, building the Puget Sound & Willapa Harbor from Maytown, Wash., to Firdale, 54 miles, and from Willapa to Raymond, three miles. (November 14, p. 940.)

COLUSA & HAMILTON.—See Southern Pacific.

GRAND TRUNK PACIFIC.—An officer writes that work is now under way on the western section as follows: In British Columbia; from Rose Lake to Hutton, 217 miles, contract let to Foley, Welch & Stewart, Winnipeg, Man. In Saskatchewan; Prince Albert branch, 36 miles, and Moose Jaw Northwest branch, 19 miles, contract let to the J. D. MacArthur Co., Winnipeg, Man.; Weyburn branch, 15 miles, contract let to John Bradley, Craven, Sask. In Manitoba, Brandon branch, 26 miles, contract let to Rigby, Hyland & Plummer. (October 17, p. 715.)

GRANTS PASS-CRESCENT CITY.—This company was organized in Oregon early this year, with $5,000,000 capital to build from Grants Pass on the Southern Pacific southwest to Crescent City, Cal., about 100 miles. We are told that the city of Grants Pass has been at work building the first section and has seven miles graded and ready for track laying. Financial arrangements have not yet been made to build the line through to the Pacific coast. L. C. Gilkey, Grants Pass, may be addressed. (April 11, p. 863.)

HOUSTON & BRAZOS VALLEY.—An officer writes that work has been finished on the Mound Railway, from Freeport, Tex., to Bryan Heights, 3.4 miles. This spur line was built to reach the sulphur mines at Bryan Heights, and is now in operation.

METOLIUS, PRINEVILLE & EASTERN.—This company will ask for incorporation to build from Metolius, Ore., southeast to Prineville, 30 miles. Most of the right of way and terminal grounds have been secured. H. P. Scheel, treasurer of the Hercules Sandstone Company, operating Tenino quarries, is back of the project.

MISSOURI, KANSAS & TEXAS.—The report of this company for the year ended June 30, 1913, shows that during the year the extension of the Wichita Falls Lines from Woodward, Okla., northwest to Forgan, 83.67 miles, was completed, and that the double track work between Waco, Tex., and Hewitt, 7.6 miles, has been completed.

MOJAVE & BAKERSFIELD.—See Southern Pacific.

MOUND RAILWAY.—See Houston & Brazos Valley.

NASHVILLE, CHATTANOOGA & ST. LOUIS.—An officer writes that the company plans to lay second track from Bridgeport, Ala., to Bolivar, 5.4 miles.

NORTH RAILWAY.—We are told that this company is now making surveys to build from Montreal, Que., to a connection with the National Transcontinental at Bell river, about 370 miles. T. L. Van Norden, assistant secretary, 95 McGill street, Montreal. (January 24, p. 191.)

NORTH YAKIMA & VALLEY.—An officer writes that work on the Cowiche branch which was started last year, is now being carried out by the Valley Construction Company, North Yakima, Wash., on the section from Spitzenburg to the mouth of Cowiche canyon, 2.8 miles, and an extension of this branch is projected to Tieton City, 6.6 miles. In addition the Simcoe branch is projected from Farron to White Swan, 11 miles.

PITTSBURG, SHAWMUT & NORTHERN.—An officer writes that work is now under way on an extension from Kittanning, Pa., southwest to Freeport, 17 miles.

PUGET SOUND & WILLAPA HARBOR.—See Chicago, Milwaukee & St. Paul.

QUANAH, ACME & PACIFIC.—An officer writes that surveys are being made on a section of 50 miles for the extension from Roaring Springs, Tex., southwest in the direction of El Paso. (June 6, p. 1245.)

SEATTLE, PORT ANGELES & LAKE CRESCENT.—An officer writes that grading work has been finished from Port Angeles, east on 10 miles, and from Port Angeles west on 15 miles. The line is being built from Oak Bay on Puget sound, in the state of Washington, west into the heavy timber district of the Olympic mountains, about 76 miles, and about 35 miles of the right of way has been secured. A 40-mile extension west has been projected. The Erickson Construction Company has the general contract. The company expects to develop a traffic in timber and agricultural products, and that the section west of Port Angeles will be ready for operation by the fall of 1914. C. J. Erickson, president, Seattle, and C. P. Donovan, chief engineer, Port Angeles. (September 19, p. 542.)

SEABOARD AIR LINE.—The report of this company for the year ended June 30, 1913, shows that an extension from Mulberry, Fla., to Bartow, with a branch to the Royster mine, was completed and is now in operation. In addition 44.05 miles of new sidings and extensions were constructed. The new yards and mechanical facilities at Norlina, N. C., and at Cayce, S. C., have been completed and put in operation, and yard extensions are now in progress at Richmond, Va., Raleigh, N. C., and Hamlet. Work is now under way on double track and revisions of grades from Hamlet, N. C., north on about 9.5 miles.

An officer writes that a contract has been given to Kiblin, Boswell & Company, Dunnellon, Fla., to build an extension from Bartow, Fla., to Pembroke, 8.5 miles.

SOUTHERN PACIFIC.—An officer writes that a contract has been given to J. Maney, Colusa, Cal., to build an extension of the Colusa & Hamilton, from Princeton, Cal., to Hamilton, 23.44 miles. A contract has been given to the Utah Construction Company, Ogden, Utah, and San Francisco, Cal., to build an extension of the Central Pacific from a point near Susanville, Cal., to Walker's Mill, 26.82 miles, and the Central Pacific will build 9.12 miles of second track from a point near Magra, Cal., to a point near Colfax. Contracts have been given to the Twohy Brothers Company, Portland, Oregon, and to McArthur Perks Company, Ltd., San Francisco, Cal., to build an extension of the Willamette-Pacific from Noti Creek, Oregon, to Marchfield, 102.32 miles, and surveys have been made to build the Mojave & Bakersfield from Mojave, Cal., northwest to Bakersfield, 85 miles.

TONOPAH & TIDEWATER.—This company has applied for permission to issue $294,000 of bonds for the purpose of constructing a 17-mile narrow gage line from the Ryan branch to borax mines, owned by the Pacific Coast Borax Company in Inyo county, Cal.

UTAH RAILWAY.—An officer writes that work is now under way by the Utah Construction Company, Ogden, Utah, building from Black Hawk, Utah, north to Castle Gate, 22 miles, also from Provo south to Thistle, 20.2 miles. In addition surveys are being made from Thistle southeast to Castle Gate, 54 miles,

to connect the two sections now under construction. William Ashton, chief engineer, Salt Lake City, Utah.

Watauga Railway.—See Watauga & Yadkin River.

Watauga & Yadkin River.—An officer writes that this company is a consolidation of the Watauga Railway and the Yadkin River Railroad, and now operates 22 miles of road from North Wilkesboro, N. C., where a connection is made with the Southern Railway, west via Grandin. In addition eight miles have been graded from Elkville Junction west to Darby, and a line located from Darby west to Boone, 26 miles. Surveys are now being made from Grandin southwest to Lenoir, 16 miles, and from Boone to Butler, 21.3 miles. H. C. Landon, general manager, North Wilkesboro. (July 4, p. 37.)

Waterloo, Cedar Falls & Northern (Electric).—An officer writes that this company finished work during 1913, between La Porte City, Iowa, and Urbana, on 19.9 miles; also between Cedar Falls and Waverly, on 0.15 miles. Contracts have been given to R. A. Elzy, Marshalltown, Iowa, for the grading work and to the Gould Construction Company, Davenport, for the bridge work on an extension from Urbana to Center Point, 5.81 miles. In addition surveys are being made for an extension from Center Point to Cedar Rapids, 17 miles. The company also laid during 1913, 0.63 miles of second track between Cedar Falls and Waverly. (October 3, p. 638.)

Willamette-Pacific.—See Southern Pacific.

Yadkin River.—See Watauga & Yadkin River.

## RAILWAY STRUCTURES.

Chicago, Ill.—The Erie has begun work on a new freight house and dock at Webster avenue and the north branch of the Chicago river. Similar structures will also be erected at Erie and Kingsbury streets.

Parsons, Kan.—The report of the Missouri, Kansas & Texas for the year ended June 30, 1913, shows that work is now under way putting up a new passenger station and office building at Parsons, Kan., and a new passenger station at Houston, Tex. During the year stations were completed at Evansville, Mo., Sherman City, Kan., Humbolt, Crowder, Okla., Canadian, Cleveland, Nelagony, Winnsboro, Tex., Newsome, Temple and at Taylor, and extensive changes are being made to the freight station at St. Louis, Mo. Steel bridge work has been installed at several places on the Fort Worth, Houston and San Antonio divisions and on the Texas Central Railroad, replacing pile trestles and steel work of lighter construction; a number of other bridges, including the Missouri river bridge at Boonville, Mo., were strengthened to permit the use of heavier rolling stock. Work is now under way strengthening the bridges between Denison, Tex., and Houston. The Union Terminal Company, of Dallas, which was organized last year, has made good progress in securing land and franchises for a passenger terminal, and plans are now being made for the building and track layout. Work on the Kansas City union station has been delayed by strikes and other causes, but it should be ready for service during the coming year.

Wilmington, N. C.—The report of the Seaboard Air Line for the year ended June 30, 1913, shows that additional terminal facilities at Wilmington, N. C., at Savannah, Ga., and at Jacksonville, Fla., have been completed. A union passenger station has been finished at Vidalia, Ga., and a union passenger station has been provided at Maxton, N. C. Passenger stations were built at Winsor, Ga., and Sarasota, Fla., and extensive additions and improvements were made to the passenger station at Henderson, S. C. Combination passenger and freight stations were built during the year at Great Falls, S. C., Statham, Ga., and Cussetta, Ga. A brick freight house was built at Monroe, N. C., and work is now under way on one at Charlotte, N. C. At Hutchinson Island, Savannah, Ga., extensive improvements have been made to the terminals, 205,000 sq. ft. of additional cotton sheds were provided, together with the necessary fire walls, two new ship berths with necessary sheds, were also provided on pier two, and three new brick cotton warehouses of 5,000 bales capacity each, were completed.

# Railway Financial News.

Alabama Great Southern.—The stockholders having approved the issue of $25,000,000 new first consolidated mortgage bonds, Potter, Choate & Prentice, New York, have bought from the company and will offer for sale $2,500,000 of these bonds, dated December 1, 1913-1943, at a price to yield 5.10 per cent. on the investment.

Buffalo & Susquehanna.—Holders of about 95 per cent. of the 4 per cent. bonds of the Buffalo & Susquehanna Railroad have assented to the reorganization plan, and the foreclosure sale was set for December 4. The plan of reorganization provides for an assessment of 10 per cent. on the preferred stock, in exchange for which the preferred stockholder will receive 10 per cent. in new 4 per cent. bonds, 20 per cent. in new 4 per cent. preferred stock, cumulative after 1914, and 30 per cent. in new common.

The company is completing traffic arrangements with the Pennsylvania Railroad.

Middletown & Unionville.—Charles I. Henry, president of this company, announces that the Middletown & Unionville has succeeded through foreclosure to the Middletown, Unionville & Water Gap Railroad and will operate it, with general office at Middletown, N. Y. The road extends from Middletown southward, 14.3 miles to State line, a short distance beyond Unionville. Heretofore it has been a part of the New York, Susquehanna & Western, having been operated by that company under an agreement. Combined with a branch of the Susquehanna, this 14-mile road makes a line from Middletown, N. Y., southward to Beaver Lake, Pa., 34 miles, where connection is made with the main line of the Susquehanna. The officers of the new company are: Charles I. Henry, president; Newman Erb, chairman, executive committee; J. A. Smith, vice-president and general manager; B. F. Wollman, general counsel; Garrett T. Townsend, treasurer; Frank H. Finn, secretary; J. W. Goetchins, auditor.

National Railways of Mexico.—The interest, amounting to $801,000, due on December 1 on the company's 2-year notes is being paid by the fiscal agents of the company as the coupons are being presented. Arrangements were made for borrowing the money to meet these interest charges from New York and London bankers.

New Orleans, Texas & Mexico.—The report of Y. Van Den Berg, who was employed by the bondholders' protective committee, says in part: "When the lines east of Houston are put in a position to control their share of the established freight and passenger traffic, it is safe to say that at no far distant period thereafter gross earnings will show not less than $8,000 a mile." The report criticises lack of management on the St. Louis, Brownsville & Mexico, pointing out at the same time that the present general manager has been in charge less than a year and is not, of course, therefore responsible; lack of consistent and constant normal maintenance on the Beaumont, Sour Lake & Western, and more or less haphazard maintenance on the New Orleans, Texas & Mexico. The report recommends the following expenditures to be made over a period of three years, starting at once:

| | Betterments. | Equipment. |
|---|---|---|
| St. Louis, Brownsville & Mexico | $3,219,240 | $2,235,000 |
| Orange & Northwestern | 68,000 | 492,000 |
| Beaumont, Sour Lake & Western | 532,285 | 1,252,200 |
| New Orleans, Texas & Mexico | 1,395,872 | ..... |
| Total | $5,215,377 | $3,979,200 |

North & South Carolina.—See Seaboard Air Line.

St. Louis, Rocky Mountain & Pacific.—The New York Stock Exchange has listed $4,235,000 Bankers Trust Company certificates of deposit for first mortgage 5 per cent. bonds, with authority to add $7,606,000 on notice of exchange for outstanding bonds. These certificates of deposit represent bonds deposited or those who have consented to the sale, under the agreement previously noted in these columns, to the Atchison, Topeka & Santa Fe.

Seaboard Air Line.—This company has an option on the North & South Carolina Railway, which runs from Hamlet, N. C., to Georgetown Junction, S. C., 78 miles.

[ADVERTISEMENT.]

# ANNUAL REPORTS.

## ANNUAL REPORT OF THE COLORADO & SOUTHERN.

CHICAGO, July 1, 1913.

*To the Stockholders of the Colorado & Southern Railway Company:*

Herewith is submitted the Fourteenth Annual Report of this Company for the year ended June 30, 1913.

There are included the reports of A. D. Parker, Vice-President, and J. H. Bradbury, General Auditor.

By order of the Board of Directors,

DARIUS MILLER,
*President.*

DENVER, COLO., July 1, 1913.

MR. D. MILLER,
*President,*
*Chicago, Ill.*

DEAR SIR:—I herewith submit the report for the fiscal year ended June 30, 1913, which report combines the operations and affairs of the lines operated by the companies named, and which are herein designated as the

"COLORADO & SOUTHERN LINES."

| Per Cent. | 1913. | OPERATING REVENUES. | 1912. | Per Cent. |
|---|---|---|---|---|
| 71.87 | $10,836,134.18 | Freight Revenue | $ 9,850,048.55 | 70.56 |
| 22.51 | 3,394,073.63 | Passenger Revenue | 3,246,772.74 | 23.26 |
| 1.45 | 218,848.38 | Mail Revenue | 216,282.70 | 1.56 |
| 1.76 | 264,279.94 | Express Revenue | 263,861.93 | 1.89 |
| 1.80 | 271,113.16 | Miscellaneous Transportation Revenue | 297,114.93 | 2.13 |
| .59 | 89,542.64 | Revenue from Operations other than Transportation | 80,750.26 | .57 |
| .02 | 3,685.00 | Joint Facilities | 5,144.57 | .03 |
| 100.00 | $15,077,676.93 | Total Operating Revenues | $13,959.975.68 | 100.00 |
| | | OPERATING EXPENSES. | | |
| 12.64 | $ 1,905,988.15 | Maintenance of Way and Structures | $ 1,637,316.29 | 11.73 |
| 20.64 | 3,111,512.80 | Maintenance of Equipment | 2,532,180.64 | 18.14 |
| 1.53 | 230,406.63 | Traffic Expenses | 236,126.75 | 1.69 |
| 32.50 | 4,901,494.00 | Transportation Expenses | 4,728,764.59 | 33.87 |
| 3.14 | 473,560.09 | General Expenses | 482,065.57 | 3.45 |
| 70.45 | $10,622,961.67 | Total Operating Expenses | $ 9,616,453.84 | 68.88 |
| 29.55 | $ 4,454,715.26 | Net Operating Revenue | $ 4,343,521.84 | 31.12 |
| ..... | 24,804.07 | Net Deficit from Outside Operations | 24,522.80 | ..... |
| ..... | $ 4,429,911.19 | Total Net Revenue | $ 4,318,999.04 | ..... |
| ..... | 520,546.72 | Taxes Accrued | 511,470.31 | ..... |
| ..... | $ 3,909,364.47 | Operating Income | $ 3,807,528.73 | ..... |
| | | OTHER INCOME. | | |
| ..... | $ 256,106.51 | Rents | $ 176,946.41 | ..... |
| ..... | 588,170.54 | Miscellaneous Interest | 613,327.89 | ..... |
| ..... | $ 844,277.05 | Total Other Income | $ 790,274.30 | ..... |
| ..... | $ 4,753,641.52 | Gross Corporate Income | $ 4,597,803.03 | ..... |
| | | DEDUCTIONS FROM GROSS CORPORATE INCOME. | | |
| ..... | $ 141,919.53 | Rents | $ 162,863.55 | ..... |
| ..... | 1,203.44 | Miscellaneous Interest | 887.68 | ..... |
| ..... | 2,874,279.94 | Interest Accrued on Funded Debt | 2,876,854.82 | ..... |
| ..... | 10,099.20 | Extinguishment of Discount on Securities Sold | 8,089.35 | ..... |
| ..... | 60,826.48 | Sinking Funds | 49,140.01 | ..... |
| ..... | $ 3,088,328.59 | Total Deductions | $ 3,097,835.41 | ..... |
| ..... | $ 1,665,312.93 | Net Corporate Income | $ 1,499,967.62 | ..... |
| ..... | 990,236.92 | Dividends | 1,300,000.00 | ..... |
| ..... | $ 675,076.01 | Surplus | $ 199,967.62 | ..... |

The entire line and physical property of The Colorado Springs & Cripple Creek District Railway has been leased to The Florence & Cripple Creek Railroad Company for a term of years, and the return from this property is treated in this report as rentals received.

The percentage of Operating Revenues required for Operating Expenses was 70.45% as compared with 68.88% in the previous year, and the proportion of Gross Income required for Interest on Funded Debt was 60.46% as compared with 62.57% in the previous year.

During the fiscal year, Refunding and Extension Mortgage Bonds of this Company were issued to cover expenditures for:

| | |
|---|---|
| Purchase of securities of The Colorado Railroad Company | $1,010,411.24 |
| And Refunding and Extension Mortgage Bonds were retired from proceeds of sale of securities pledged with the Trustee | 28,000.00 |
| First Mortgage Bonds of C. S. & C. C. D. Ry. Co. were retired through Sinking Fund | 58,000.00 |
| Deferred Rentals under Equipment Leases were discharged | 375,226.18 |
| Making the net increase in Mortgage, Bonded and Secured Debt | $ 549,185.06 |

The outsanding Capital Stock was reduced by the acquisition of 48.72 shares, par value $4,872.00, "Stamped Stock," and 7 shares, par value $700.00, Common Stock of Fort Worth & Denver City Railway Company.

There were charges to Capital Account, aggregating $616,916.24 for additions and betterments to property. Of this amount, there was expended for:

| | |
|---|---|
| Structures and Machinery | $ 93,628.51 |
| Substituting Permanent Bridges for Wooden Ones | 94,618.19 |
| Completion New Line—Southern Jct. to Walsenburg Jct. | 25,574.21 |
| Completion New Line—Wellington to Cheyenne | 43,301.02 |
| Additional Spur and Industry Tracks | 19,714.05 |
| Additional Yard Tracks and Sidings | 19,091.68 |
| Purchase of Land | 31,203.90 |
| Ballast on F. W. & D. C. Ry. | 71,765.16 |
| Relaying Heavier Rail—36 Miles Wyoming District | 67,717.16 |
| Relaying Heavier Rail—15 Miles Fort Collins District | 17,113.47 |
| Various Other Additions and Betterments | 133,188.89 |

The following statistical tables have been compiled in the form required for the Annual Report of Carriers to the Interstate Commerce Commission:

GENERAL BALANCE SHEET.

JUNE 30, 1913.

ASSETS.

| | | |
|---|---|---|
| Property Investment—Road and Equipment: | | |
| Road | $94,216,029.13 | |
| Equipment | 15,453,944.58 | |
| | | $109,669,973.71 |
| Reserve for Accrued Depreciation—Credit | | 2,880,998.70 |
| Total | | $106,788,975.01 |
| Securities: | | |
| Securities of Proprietary, Affiliated and Controlled Companies—Pledged— | | |
| Stocks | $ 410,308.21 | |
| Funded Debt | 8,760,000.00 | |
| | | 9,170,308.21 |
| Securities of Proprietary, Affiliated and Controlled Companies—Unpledged— | | |
| Stocks | $ 108,773.65 | |
| Funded Debt | 3,212,321.18 | |
| | | 3,321,094.83 |
| Total | | $ 12,491,403.04 |
| Other Investments: | | |
| Advances to Proprietary, Affiliated and Controlled Companies, for Construction Equipment and Betterments | | $ 622,662.80 |
| Miscellaneous Investments— | | |
| Physical Property | $ 4,710.00 | |
| Securities Pledged | 1,021,557.30 | |
| Securities Unpledged | 48,457.40 | |
| | | 1,074,724.70 |
| Total | | $ 1,697,387.50 |
| Working Assets: | | |
| Cash | | $ 907,699.97 |
| Securities Issued or Assumed, Held in Treasuries— | | |
| Funded Debt | | 4,058,276.55 |
| Loans and Bills Receivable | | 7,850.00 |
| Traffic and Car Service Balances Due from Other Companies | | 344,158.20 |
| Net Balance Due from Agents and Conductors | | 181,885.96 |
| Miscellaneous Accounts Receivable | | 360,935.58 |
| Materials and Supplies | | 1,363,331.79 |
| Other Working Assets | | 8,442.45 |
| Total | | $ 7,232,580.50 |
| Accrued Income Not Due: | | |
| Unmatured Interest, Dividends and Rents Receivable | | $ 287,743.64 |
| Deferred Debit Items: | | |
| Advances— | | |
| Temporary Advances to Proprietary, Affiliated and Controlled Companies | $ 1,500.00 | |
| Working Funds | 837.18 | |
| Other Advances | 180,900.79 | |
| | | $ 183,237.97 |
| Rents and Insurance Paid in Advance | | 22,979.57 |
| Unextinguished Discount on Funded Debt | | 224,578.64 |
| Special Deposits | | 5,227.71 |
| Cash and Securities in Sinking Funds | | 405.85 |
| Other Deferred Debit Items | | 120,459.17 |
| Total | | $ 556,888.91 |
| Grand Total | | $129,054,978.60 |

LIABILITIES.

| | | |
|---|---|---|
| Capital Stock: | | |
| Common Stock | | $ 31,025,468.00 |
| Preferred Stock | | 17,000,000.00 |
| Total | | $ 48,025,468.00 |
| Mortgage, Bonded and Secured Debt: | | |
| Funded Debt— | | |
| Mortgage Bonds— | | |
| Held by Companies | $ 4,058,276.55 | |
| Not Held by Companies | 61,606,900.00 | |
| | | 65,665,176.55 |
| Equipment Trust Obligations | | 906,452.36 |
| Total | | $ 66,571,628.91 |
| Working Liabilities: | | |
| Traffic and Car Service Balances Due to Other Companies | | $ 349,573.99 |
| Audited Vouchers and Wages Unpaid | | 1,056,871.64 |
| Matured Interest, Dividends and Rents Unpaid | | 74,641.42 |
| Other Working Liabilities | | 26,000.97 |
| Total | | $ 1,507,088.02 |
| Accrued Liabilities Not Due: | | |
| Unmatured Interest, Dividends and Rents Payable | | $ 625,639.24 |
| Taxes Accrued | | 360,296.31 |
| Total | | $ 985,935.55 |
| Deferred Credit Items: | | |
| Other Deferred Credit Items | | $ 65,167.36 |
| Appropriated Surplus: | | |
| Additions to Property since June 30, 1907, through Income | | $ 4,278,090.61 |
| Reserves from Income or Surplus— | | |
| Invested in Sinking Funds | $ 29,883.81 | |
| Invested in Road and Equipment | 1,589,251.76 | |
| Not Specifically Invested | 459,799.03 | |
| | | 2,078,934.60 |
| Total | | $ 6,357,025.21 |
| Profit and Loss: | | |
| Balance | | $ 5,542,665.55 |
| Grand Total | | $129,054,978.60 |

## INCOME STATEMENT.

| | | | |
|---|---|---|---|
| RAIL OPERATIONS— | | | |
| Operating Revenues: | | | |
| Revenue from Transportation: | | | |
| Freight | $10,836,134.18 | | |
| Passenger | 3,394,073.63 | | |
| Excess Baggage | 32,999.56 | | |
| Mail | 218,848.38 | | |
| Express | 264,279.94 | | |
| Other Passenger Train | 1,400.08 | | |
| Switching | 226,609.83 | | |
| Special Service Train | 8,040.43 | | |
| Miscellaneous Transportation | 2,063.26 | | |
| | | $14,984,449.29 | |
| Revenue from Operations Other than Transportation: | | | |
| Station and Train Privileges | $ 22,444.25 | | |
| Parcel Room Receipts | 792.77 | | |
| Storage Freight | 2,751.65 | | |
| Storage Baggage | 2,515.91 | | |
| Car Service | 49,189.67 | | |
| Rent of Buildings and Other Property | 5,670.65 | | |
| Miscellaneous | 6,177.74 | | |
| | | $ 89,542.64 | |
| Joint Facilities Cr | | 3,685.00 | |
| Total Operating Revenues | | $15,077,676.93 | |
| Operating Expenses: | | | |
| Maintenance of Way and Structures | $ 1,905,988.15 | | |
| Maintenance of Equipment | 3,111,512.80 | | |
| Traffic Expenses | 230,406.63 | | |
| Transportation Expenses | 4,901,494.00 | | |
| General Expenses | 473,560.09 | | |
| | | $10,622,961.67 | |
| Net Operating Revenue | | | $4,454,715.26 |
| OUTSIDE OPERATIONS— | | | |
| Revenues | | $ 92,788.73 | |
| Expenses | | 117,592.80 | |
| Net Deficit from Outside Operations | | | $ 24,804.07 |
| Total Net Revenue | | | $4,429,911.19 |
| Railway Tax Accruals | | | 520,546.72 |
| Railway Operating Income | | | $3,909,364.47 |
| OTHER INCOME. | | | |
| Income from Lease of Road | | $ 213,284.97 | |
| Joint Facility Rent Income | | 25,286.65 | |
| Miscellaneous Rent Income | | 17,534.89 | |
| Separately Operated Properties:— | | | |
| Profit | | 1,301.57 | |
| Dividend Income | | 32,060.00 | |
| Income from Funded Securities | | 489,233.39 | |
| Income from Other Securities and Accounts | | 65,575.58 | |
| | | | $ 844,277.05 |
| Gross Income | | | $4,753,641.52 |
| DEDUCTIONS FROM GROSS INCOME. | | | |
| Hire of Equipment—Balance | | $ 57,330.62 | |
| Joint Facility Rent Deductions | | 51,566.25 | |
| Miscellaneous Rent Deductions | | 33,022.66 | |
| Interest Deductions for Funded Debt | | 2,874,279.94 | |
| Other Interest Deductions | | 1,203.44 | |
| Amortization of Discount on Funded Debt | | 10,099.20 | |
| | | | $3,027,502.11 |
| Net Income | | | $1,726,139.41 |
| DISPOSITION OF NET INCOME. | | | |
| Appropriations of Income to Sinking Funds | | $ 60,826.48 | |
| Dividend Appropriations of Income: | | | |
| Common Stock— | | | |
| 1 per cent., payable Dec. 31, 1912 | | 310,000.00 | |
| First Preferred Stock— | | | |
| 2 per cent., payable Oct. 1, 1912 | $ 170,000.00 | | |
| 2 per cent., payable Apr. 1, 1913 | 170,000.00 | | |
| | | 340,000.00 | |
| Second Preferred Stock— | | | |
| 2 per cent., payable Oct. 1, 1912 | $ 170,000.00 | | |
| 2 per cent., payable Apr. 1, 1913 | 170,000.00 | | |
| | | 340,000.00 | |
| Other Dividends | | 236.92 | |
| | | | $1,051,063.40 |
| Income Balance Transferred to Credit of Profit and Loss | | | $ 675,076.01 |

### PROFIT AND LOSS STATEMENT.

| | | |
|---|---|---|
| Credit: | | |
| Balance June 30, 1912 | $10,661,375.97 | |
| Balance for Year brought forward from Income Account | 675,076.01 | |
| Additions for Year: | | |
| Miscellaneous Credits | 67,066.43 | |
| | | $11,403,518.41 |
| Debit: | | |
| Appropriations of Surplus | $ 5,839,462.62 | |
| Deductions for Year: | | |
| Miscellaneous Debits | 21,390.24 | |
| | | $ 5,860,852.86 |
| Balance Credit, June 30, 1913 | | $ 5,542,665.55 |

## REPORT OF THE DIRECTORS OF THE SEABOARD AIR LINE RAILWAY FOR THE FISCAL YEAR ENDED JUNE 30, 1913.

PORTSMOUTH, VA., October 23rd, 1913.

To the Stockholders of the Seaboard Air Line Railway:

The Board of Directors submits the following report of the operations of the property for the year ended June 30, 1913:

### INCOME ACCOUNT FOR YEAR ENDED JUNE 30, 1913.

| | 1913 | 1912 | Increase |
|---|---|---|---|
| Gross Revenue | $24,527,864.62 | $22 921,903.98 | $1,605,960.64 |
| Operating Expenses and Taxes | 17,681,612.65 | 17,197,086.81 | 484,525.84 |
| Net Operating Revenue | $ 6,846,251.97 | $ 5,724.817.17 | $1,121,434.80 |
| Outside Operations | (Dr.)26,314.12 | (Dr.)22,686.02 | 3,628.10 |
| Operating Income | $ 6,819,937.85 | $ 5,702,131.15 | $1,117,806.70 |
| Other Income | 220,063.88 | 183,377.70 | 36,686.18 |
| Gross Income | $ 7,040,001.73 | $ 5,885,508.85 | $1,154,492.88 |
| Rentals and Hire of Equipment | 397,589.17 | 361,337.37 | 36,251.80 |
| Applicable to Interest | $ 6,642,412.56 | $ 5,524,171.48 | $1,118,241.08 |
| Fixed Interest Charges | 3,656,558.89 | 3,460,727.17 | 195,831.72 |
| Balance | $ 2,985,853.67 | $ 2,063,444.31 | $ 922,409.36 |
| Full 5% Interest on Adjustment (Income) Bonds | 1,250,000.00 | 1,249,658.34 | 341.66 |
| Net Income | $ 1,735,853.67 | $ 813,785.97 | $ 922,067.70 |

The Gross Revenue increased 7.01 per cent., Operating Expenses and Taxes increased 2.82 per cent., and Operating Income increased 19.59 per cent.

The Operating Expenses, exclusive of Taxes were 68.19 per cent. of the Gross Revenue, as compared with 71.02 per cent. the previous year; and including Taxes, 72.09 per cent. of Gross Revenue as compared with 75.02 per cent. for the preceding year.

### MILEAGE OPERATED.

| | | |
|---|---|---|
| The mileage of the Seaboard Air Line Railway in operation on June 30, 1912, was | | 3,070.12 |
| Extensions, etc., constructed during the year | | 11.86 |
| Mileage in operation June 30, 1913 | | 3,081.98 |
| Made up as follows: | | |
| MILEAGE OWNED. | | |
| Seaboard Air Line Railway and branches | | 3,016.39 |
| LEASED LINES. | | |
| Meldrim, Ga., to Lyons, Ga. | 57.65 | |
| TRACKAGE. | | |
| Howells, Ga., to Atlanta, Ga. | 3.00 | |
| Hilton, N. C., to Navassa, N. C. | 2.40 | |
| In Birmingham, Ala., and vicinity | 15.11 | |
| Near Mulberry, Fla. | 1.46 | 79.62 |
| | | 3,096.01 |
| DEDUCT. | | |
| Amelia Beach branch, leased to Street Railway Company at Fernandina, Fla. | 2.00 | |
| Gibson, N. C., branch, leased to the North & South Carolina Railway | 10.13 | |
| Silver Springs, Fla., branch, leased to the Ocala Northern Railway | 1.90 | 14.03 |
| Total mileage operated June 30, 1913 | | 3,081.98 |
| Sidings (including 19.29 miles on Leased Lines and Trackage) | | 817.52 |
| Average miles of road operated during the year | | 3,073.58 |
| Average miles of road operated shows an increase over previous year of | | 00.49% |

### CAPITAL STOCK.

There has been no change in the capital stock during the year.

### MORTGAGE, BONDED AND SECURED DEBT.

During the year $800,000 par value 4% Refunding Bonds were issued in reimbursement of expenditures made to retire equipment trust obligations and sold, making a total of $23,800,000 par value of 4% Refunding Bonds outstanding on June 30, 1913.

An issue of $6,000,000 par value of Three Years 5% Gold Notes, dated March 1, 1913, payable March 1, 1916, redeemable in whole or in part at par and accrued interest, secured by the peldge of 4% Refunding Bonds of the Company, were sold during the year for the purpose of providing funds for additions, betterments and improvements to the property and for the retirement of temporary obligations, the proceeds of which had been similarly used. Of said notes $5,000,000 par value were delivered up to June 30, 1913, leaving $1,000,000 for later delivery. For further details of the Company's funded debt see Table No. 4.

### EQUIPMENT.

An Equipment Agreement, Series "O," was entered into on July 15th, 1912, for the purchase of:

- 5 Passenger Locomotives,
- 15 Freight Locomotives,
- 5 Switching Locomotives,
- 1 Dummy Locomotive,
- 10 All Steel Passenger Coaches,
- 7 All Steel Mail and Baggage Cars,
- 7 All Steel Passenger and Baggage Cars,
- 3 All Steel Express Cars,
- 6 All Steel Dining Cars,
- 1000 Steel Upper and Under Frame Ventilated Box Cars,
- 200 All Steel Coal Cars,
- 25 Steel Under Frame Caboose Cars,
- 2 Wrecking Cranes,

for which $240,581.42 was paid in cash and equipment trust obligations aggregating $2,060,000 were issued, payable in twenty consecutive semi-annual instalments of $103,000 each, bearing interest at the rate of 4½% per annum. All of this equipment was received during the fiscal year except the following:

- 7 Mail and Baggage Cars,
- 4 Passenger and Baggage Cars.

There was built during the year at Portsmouth Shops, and put in service to replace Trust Equipment destroyed:

1 Steel Express Car

In addition to the equipment named above, the following were purchased:

1 Steam Ditcher,
1 Ballast Spreader Car,
1 Car Float,
1 Ferry Boat,

all of which have been received.

## EXTENSIONS.

An extension to the Company's line in Florida, from Mulberry to Bartow, with a branch line to the Royster Mine, mentioned in last year's report was completed and put in operation March 15, 1913—11.86 miles.

## MAINTENANCE OF WAY AND STRUCTURES.

## ROADWAY, TRACK AND STRUCTURES.

Roadway, track and structures of the railway have been maintained at a cost of $3,014,956.54, which represents an expenditure per mile of road of $980.93.

## SIDE TRACKS.

44.05 miles of new sidings and extensions of existing sidings were constructed, and there were deducted by removal and changes of old sidings 3.79 miles, making a net increase over previous year of 40.26 miles.

There were also constructed 0.14 mile of new sidings and extensions of existing sidings on leased lines.

## TIE RENEWALS.

The tie renewals were 1,267,705 cross ties and 924 sets of switch ties, and the cost, $533,761.70, was charged to Operating Expenses.

## NEW RAIL.

130.05 miles of new 75-pound and 1.01 miles 75-pound steel rail making a total of 131.06 miles were laid in the main line track, releasing therefrom 58, 60, 60.5, 70, 75 and 80-pound worn rail, and there was charged net to Operating Expenses $62,857.00 and to Capital Account $101,407.05.

## BALLAST.

189,480 cubic yards of gravel and slag ballast were put under main line track at a cost of $155,018.59, of which $138,921.88 was charged to Capital Account and $16,096.71 to Operating Expenses.

## TRESTLES FILLED.

6,432 lineal feet of wooden trestles were filled in, and of the total cost thereof, including culverts, $42,266.09 was charged to Operating Expenses.

## TRESTLES REBUILT AND BALLAST DECKED.

There were built during the year with creosoted timber 5,804 lineal feet of trestles, which have been ballast decked at a cost of $60,477.14, which was charged to Operating Expenses.

## TRESTLES STRENGTHENED.

Additional stringers were put in 107 trestles during the year to strengthen same to carry heavier power.

## BRIDGES.

Work has been done on thirty-nine bridges, replacing with steel or strengthening them for heavy power. Of this number, twenty-four have been completed, and the remaining fifteen will be finished by June 30th, 1914.

Fifteen of the above bridges were authorized during this year and two of the fifteen have been completed.

Of the bridges completed the principal ones are:

| | Length. |
|---|---|
| Richmond Viaduct, Richmond, Va., replacing floor with steel and concrete | 326 feet. |
| A. C. L. R. R. Underpass near Chester, Va., replacing floor with steel and concrete | 92 " |
| McAlpin Creek, near Mathews, N. C., deck plate girders | 192 " |
| Savannah River, near Clyo, Ga., trestle elimination, deck plate girders | 3,750 " |
| College Street, Cedartown, Ga., reinforced concrete overpass | 71 " |
| Main Street, Abbeville, S. C., deck beam spans | 79 " |

The total expenditures for bridge renewals during the year were $192,315.46, of which $180,881.06 was charged to Capital Account and $11,434.40 to Operating Expenses.

## RAIL IN MAIN LINE TRACK.

Of the total operated main line mileage of the system, 3,081.75 miles are laid with steel rails and 0.23 miles with iron rails.

The steel rail is made up as follows:

| Miles | Weight | |
|---|---|---|
| 206.86 | 85 lb. | rail. |
| 104.70 | 80 " | |
| 1,178.35 | 75 " | |
| 169.41 | 70 " | |
| 220.54 | 68 " | |
| 18.87 | 65 " | |
| 60.48 | 63.5 " | |
| 5.72 | 60.5 " | |
| 565.90 | 60 " | |
| 35.41 | 60 " | (resawed) |
| 237.33 | 58 " | |
| 278.18 | 56 " | and lighter. |

The above does not include 2.00 miles of Amelia Beach Branch, leased to Street Railway at Fernandina, Fla.; 10.13 miles of Gibson Branch, leased to North & South Carolina Railway Company; or 1.90 miles of Silver Springs Branch, leased to Ocala Northern Railway.

## MAINTENANCE OF EQUIPMENT.

The equipment of the Railway was maintained during the year at a cost of $3,338,541.64.

Included in the cost of maintenance is $113,690.08, representing value of equipment destroyed or retired from service during the year, and credited to Cost of Equipment.

There were also included in the cost of maintenance $344,689.49 for depreciation, which was credited to Reserve for Accrued Depreciation.

The cost of maintenance per article owned was as follows:

| | |
|---|---|
| Average cost per annum per Locomotive owned | $2,557.06 |
| Average cost per annum per Passenger car owned | 808.79 |
| Average cost per annum per Freight car owned | 59.90 |

## GENERAL REMARKS.

The permanent way and equipment have not only been fully maintained, but in addition thereto there has been a betterment in condition in line with a policy which has been adopted of steadily improving the property. As a result of this policy and with the completion of the extensive bridge program, including the filling of trestles, which has been under way, together with other similar permanent improvements, it has been possible during the past year to make a substantial reduction in Maintenance of Way and Structures.

The additional terminal facilities at Wilmington, Savannah and Jacksonville, referred to in the last annual report, have been completed.

The union passenger station at Vidalia, Ga., mentioned in the last annual report, has been completed. A union passenger station has been provided at Maxton, N. C.

Passenger stations have been built at Winder, Ga., and Sarasota, Fla., and extensive additions and improvements have been made to the passenger station at Henderson, N. C.

Combination passenger and freight stations have been constructed during the year at Great Falls, S. C., Statham, Ga., and Cussetta, Ga.

A brick freight depot has been built at Monroe, N. C., and one is now in process of construction at Charlotte, N. C.

The new yards and mechanical facilities at Norlina, N. C., and Cayce, S. C., referred to in the last annual report, have been completed and put in operation.

Yard extensions are now in process of construction at Richmond, Va., Raleigh, N. C., and Hamlet, N. C., and at the last named place are about completed.

Water stations and pumping facilities have been provided at Norlina, N. C., and McKenny, Va., and work has been started to supply suitable water facilities at Apex, N. C.

A mechanical coal elevator is under construction at Richland, Ga., and a coal storage plant of approximately fifteen thousand tons capacity is under construction at Savannah, Ga. The coal storage plant at Jacksonville, Fla., is being extended in order to increase its capacity to fifteen thousand tons.

Turntables, eighty-five feet long have been installed at Cayce, S. C., and at Norlina, N. C. The installation of an eighty-five foot turntable is now in progress at Hamlet, N. C.

At Hutchinson Island, Savannah, Ga., extensive improvements have been made to the Terminals. Two hundred and five thousand square feet of additional cotton sheds were provided, together with the necessary fire walls, two new ship berths with necessary sheds for accumulating cargo were provided on Pier Two, and three new brick cotton warehouses of 5,000 bales capacity each, were completed. Additional tracks are under construction, and in connection with the Atlantic Compress Company, a change is being made in the location of the compresses which will make available for the Railway's use 135,000 square feet of additional shed room for the coming season, 5,340 square yards of brick cotton platform have been laid at a cost of $3,204.00, which was charged to Operating Expenses, to replace worn out wooden platforms.

At Seddon Island, Tampa, Fla., there is now in course of construction a steel phosphate elevator with two conveyors, each having a capacity of three hundred tons per hour. The necessary tracks, wharf, dredging, etc., are included in this work.

Work is now in progress on double track and revision of grade from Hamlet, N. C., northward about nine and one-half miles, which will provide a five-tenths per cent. compensated grade line thereon. This work will fit in with and form a part of a comprehensive plan which has been made for the ultimate development of the line between Norlina and Hamlet, North Carolina.

Six old twenty-thousand gallon water stations have been replaced with fifty-thousand gallon tanks, and suitable pumping facilities have been provided.

The use of creosoted piling has been continued in maintenance work on docks, wharves, and trestles. The work on the Maxwell lumber dock at Jacksonville, Fla., was completed during the year.

Eight track scales have been rebuilt with concrete foundations and steel I-beams, replacing wood.

213 industrial sidings and extensions to industrial sidings already existing have been constructed or are in process of construction.

67 depots and freight stations have been constructed or substantially added to during the year.

55 passing tracks have been constructed or extended, or are in process of construction.

During the year there have been constructed and placed in operation, 285 miles additional telephone circuits between Columbia, S. C., and West Jacksonville, Fla. This aggregates 1,374 miles in operation June 30, 1913.

The parcel post, inaugurated January 1, 1913, has greatly added to the volume and weight of the mail handled, thereby adding to the cost of handling, for which up to the close of the fiscal year the company had received no revenue. This service has also tended to decrease the normal increase in revenue received from express business, thus working a double loss to the railway. Everything possible is being done to secure from the Government adequate compensation for this increase in mail handled.

The accounts for the fiscal year were examined by Messrs. Haskins and Sells, whose certificate appears on page 10.

## CHANGES IN ORGANIZATION.

Mr. N. S. Meldrum having resigned as President, Mr. W. J. Harahan was elected, effective September 26th, 1912.

Mr. C. H. Hix, Vice-President and General Manager, resigned, effective November 1st, 1912, to accept service with another Company.

Mr. E. D. Kyle having resigned to accept service with another Company, effective November 1, 1912, Mr. L. E. Chalenor was appointed Freight Traffic Manager.

Mr. W. L. Seddon was appointed Assistant to the President, and Mr. W. D. Faucette was appointed Chief Engineer, effective January 1st, 1913.

Mr. T. W. Roby, Comptroller, died on February 7th, and Mr. H. W. MacKenzie was elected Comptroller February 19th, 1913.

Mr. A. J. Poole having resigned, effective April 5th, 1913, Mr. J. W. Small was appointed Superintendent Motive Power.

Mr. H. W. Stanley was appointed General Manager, effective May 1st, 1913.

[redacted]

The death of the Comptroller, Mr. Thomas Walton Roby, which occurred February 7th, 1913, is recorded with deep sorrow and regret. Mr. Roby entered the Railroad employ with one of the predecessor companies of the Seaboard Air Line Railway, in 1878, and was an active and efficient officer during his entire thirty-five years of service.

[redacted]

The Board records its appreciation of the loyal and efficient services rendered by the officers and employes of your Company during the year.

By order of the Board:

W. J. HARAHAN,
President.

TABLE No. 10.

TRAFFIC STATISTICS.

YEAR ENDED JUNE 30, 1913, COMPARED WITH YEAR ENDED JUNE 30, 1912.

| | 1913. | 1912. | INCREASE OR DECREASE. |
|---|---|---|---|
| Average miles operated | 3,073.58 | 3,058.63 | 14.95 |
| **FREIGHT TRAFFIC.** | | | |
| REVENUE FREIGHT. | | | |
| Number of tons carried | 10,409,242 | 9,406,877 | 1,002,365 |
| Number of tons carried one mile | 1,538,446,241 | 1,390,977,614 | 147,468,627 |
| Number of tons carried one mile per mile of road | 500,539 | 454,771 | 45,768 |
| Average distance hauled each ton | 147.80 | 147.87 | —.07 |
| Total Freight Train Revenue | $16,788,111.56 | $15,433,239.16 | $1,354,872.40 |
| Average amount received from each ton | $1.61.281 | $1.64.063 | —$.02.782 |
| Average receipt per ton per mile | $.01.091 | $.01.110 | —$.00.019 |
| Freight Train Revenue per mile of road | $5,462.07 | $5,045.80 | $416.27 |
| Freight Train Revenue per train mile | $2.68.352 | $2.63.200 | $.05,152 |
| Average number of tons per train mile | 245.91 | 237.22 | 8.69 |
| Average number of tons per loaded car mile | 15.09 | 14.87 | .22 |
| ALL FREIGHT (Including Company's Material, hauled free). | | | |
| Number of tons carried | 12,093,055 | 10,897,475 | 1,195,580 |
| Number of tons carried one mile | 1,729,894,658 | 1,575,592,671 | 154,301,987 |
| Average number of tons per train mile | 276.52 | 267.98 | 8.54 |
| Average number of tons per loaded car mile | 16.96 | 16.84 | .12 |
| **PASSENGER TRAFFIC.** | | | |
| Number of Passengers carried | 4,928,125 | 4,870,104 | 58,021 |
| Number of Passengers carried one mile | 237,424,214 | 231,202,542 | 6,221,672 |
| Number of Passengers carried one mile per mile of road | 77,247 | 75,590 | 1,657 |
| Average distance carried each Passenger | 48.18 | 47.47 | .71 |
| Total Revenue from Passengers | $5,221,199.82 | $5,050,067.90 | $171,131.92 |
| Average Amount received from each Passenger | $1.05.947 | $1.03.695 | $.02.252 |
| Average receipt per Passenger per mile | $.02.199 | $.02.184 | $.00.015 |
| Passenger Revenue per train mile | $.91.760 | $.92.398 | —$.00.638 |
| Total Passenger Train Revenue | $6,654,615.17 | $6,401,739.53 | $252,875.64 |
| Passenger Train Revenue per mile of road | $2,165.10 | $2,093.01 | $72.09 |
| Passenger Train Revenue per train mile | $1.16.951 | $1.17.435 | —$.00.484 |
| Average number of Passengers per train mile | 41.73 | 42.41 | —.68 |
| Average number of Passengers per car mile | 7.93 | 7.88 | .05 |

REVENUE AND OPERATING EXPENSES.

| | | | |
|---|---|---|---|
| Passenger and Freight Train Revenue | $23,442,726.73 | $21,834,978.69 | $1,607,748.04 |
| Passenger and Freight Train Revenue per mile of road | $7,627.17 | $7,138.81 | $488.36 |
| Gross Revenue | $24,527,864.62 | $22,921,903.98 | $1,605,960.64 |
| Gross Revenue per mile of road | $7,980.23 | $7,494.17 | $486.06 |
| Gross Revenue per train mile | $2.04.995 | $2.02.274 | $.02.721 |
| Operating Expenses | $16,725,612.65 | $16,280,086.81 | $445,525.84 |
| Operating Expenses per mile of road | $5,441.74 | $5,322.67 | $119.07 |
| Operating Expenses per train mile | $1.39.786 | $1.43.663 | —$.03.877 |
| Net Operating Revenue | $7,802,251.97 | $6,641,817.17 | $1,160,434.80 |
| Net Operating Revenue per mile of road | $2,538.49 | $2,171.50 | $366.99 |
| Net Operating Revenue per train mile | $.65.209 | $.58.611 | $.06.598 |

TABLE No. 11.

FREIGHT TRAFFIC STATISTICS, BY MONTHS.

YEAR ENDED JUNE 30, 1913.

| MONTHS | Number of Tons | Number of Tons One Mile | Freight Revenue | Average Rate Per Ton Per Mile (Cents) | Average Distance Hauled (Miles) |
|---|---|---|---|---|---|
| July 1912 | 747,495 | 108,537,815 | $1,119,918.59 | 01.032 | 145.20 |
| August | 784,576 | 109,501,750 | 1,122,310.97 | 01.025 | 139.56 |
| September | 751,872 | 105,362,250 | 1,176,885.13 | 01.117 | 140.13 |
| October | 928,709 | 135,119,213 | 1,535,576.47 | 01.136 | 145.49 |
| November | 901,937 | 128,820,585 | 1,488,498.01 | 01.115 | 142.83 |
| December | 846,524 | 130,448,496 | 1,467,337.89 | 01.125 | 154.10 |
| January 1913 | 920,540 | 138,437,730 | 1,481,955.59 | 01.070 | 150.39 |
| February | 843,385 | 125,860,514 | 1,479,172.80 | 01.175 | 149.23 |
| March | 1,031,379 | 145,479,904 | 1,646,018.80 | 01.131 | 141.05 |
| April | 952,653 | 137,467,010 | 1,470,362.39 | 01.070 | 144.30 |
| May | 874,374 | 140,804,610 | 1,456,418.61 | 01.034 | 161.03 |
| June | 825,798 | 132,606,364 | 1,343,656.31 | 01.013 | 160.58 |
| TOTAL FOR YEAR 1913 | 10,409,242 | 1,538,446,241 | $16,788,111.56 | 01.091 | 147.80 |
| TOTAL FOR YEAR 1912 | 9,406,877 | 1,390,977,614 | $15,433,239.16 | 01.110 | 147.87 |
| Increase | 1,002,365 | 147,468,627 | $1,354,872.40 | ..... | ..... |
| Per Cent of Increase | 10.66 | 10.60 | 08.78 | ..... | ..... |
| Decrease | ..... | ..... | ..... | 00.019 | .07 |
| Per Cent of Decrease | ..... | ..... | ..... | 01.71 | 00.05 |

TABLE NO. 9.

EXPENDITURES FOR IMPROVEMENTS, BETTERMENTS AND EXTENSIONS CHARGED TO CAPITAL ACCOUNT.

YEAR ENDED JUNE 30, 1913.

SUMMARY OF EXPENDITURES:

| | |
|---|---|
| Additions and Betterments on Existing Mileage | $1,685,254.08 |
| Equipment Acquired | 1,931,994.23 |
| Expenditures for Extensions | 41,803.46 |
| TOTAL AS ABOVE | $3,659,051.77 |

## MISSOURI, KANSAS & TEXAS RAILWAY COMPANY ANNUAL REPORT.

St. Louis, Mo., October 29, 1913.

*To the Stockholders of Missouri, Kansas & Texas Railway Company:*

The directors and officers of your Company submit herewith their report for the fiscal year ended June 30, 1913.

The operations of the Lines named

| | |
|---|---|
| Missouri, Kansas & Texas Railway Company | 1,744.41 |
| The Missouri, Kansas & Texas Railway Company of Texas | 1,293.78 |
| Texas Central Railroad Company | 308.72 |
| The Denison, Bonham & New Orleans Railroad Company | 24.15 |
| The Dallas, Cleburne & Southwestern Railway Company | 9.82 |
| Missouri, Kansas & Texas Terminal Company of St. Louis | ..... |
| Wichita Falls & Northwestern Railway Company | 328.68 |
| Wichita Falls & Northwestern Railway Company of Texas | 18.02 |
| Wichita Falls & Wellington Railway Company of Texas | 15.00 |
| Wichita Falls & Southern Railway Company | 56.21 |
| Wichita Falls Railway Company | 17.98 |
| Total miles operated June 30, 1913 | 3,816.77 |

were as follows:

### RESULTS FOR THE YEAR.

(Includes eight months' operation of Wichita Falls Lines, from November 1, 1912. Intercorporate income items are excluded.)

| | | |
|---|---|---|
| Operating Revenues were | | $32,346,258.39 |
| (Increase $4,159,539.28 or 15%) | | |
| Operating Expenses were | | 22,808,412.39 |
| (Increase $1,602,563.69 or 8%) | | |
| Net Operating Revenue was | | $ 9,537,846.00 |
| (Increase $2,556,975.59 or 37%) | | |
| Taxes were | | 1,287,903.29 |
| (Increase $ 227,721.82 or 21%) | | |
| Operating Income, Taxes deducted, was | | $ 8,249,942.71 |
| (Increase $2,329,253.77 or 28%) | | |
| Miscellaneous Income was | | 666,611.06 |
| (Increase $ 310,215.39 or 87%) | | |
| | | $ 8,916,553.77 |
| Rentals and other Payments were | | 621,373.55 |
| (Increase $ 6,999.86 or 1%) | | |
| Income for the year available for Interest was | | $ 8,295,180.22 |
| (Increase $2,632,469.30 or 46%) | | |
| Interest (72% of amount available) amounted to | | 5,978,194.75 |
| (Increase $ 332,652.04 or 6%) | | |
| Net Income for the year amounted to | | $ 2,316,985.47 |
| (Increase $2,299,817.26) | | |

Dividends declared during the year:

| | | |
|---|---|---|
| M., K. & T. Ry. Co. Preferred Stock (4%) | $520,000.00 | |
| Texas Central R. R. Co. Stock outstanding (5%) | 1,010.00 | |
| Wichita Falls & Northwestern Ry. Co. Stock outstanding (6%) | 42.00 | 521,052.00 |

Remainder, devoted to improvement of physical and other assets (equivalent to 2.84% on M., K. & T. Ry. Co. Common Stock) $ 1,795,933.47

### MILEAGE.

The average mileage operated during the year was 3,677.47, an increase over the previous year of 279.28 miles.

The total mileage operated on June 30, 1913, increased 417.91 miles as compared with the mileage operated June 30, 1912, as follows:

| | |
|---|---|
| Wichita Falls, Texas, to Red River | 18.02 miles |
| Red River to Forgan, Oklahoma | 286.78 " |
| Altus, Oklahoma, to Wellington, Texas | 56.90 " |
| Wichita Falls to Newcastle, Texas | 56.21 " |
| Total | 417.91 miles |

### OPERATIONS.

The gross and net earnings were the largest in your Company's history. The surplus, after payment of all charges, was larger than any previous year except 1907. Improved business conditions generally in the Southwest and increased passenger travel contributed to swell the revenue, while favorable operating conditions during the year enabled the traffic to be handled with a relatively small increase in operating expenses.

Operating expenses were increased largely because of heavier traffic, higher standards of maintenance and additional mileage operated. The ratio of expenses to earnings was 70.51% as compared with 75.23% in the previous year. While operating revenues increased $4,159,539.28, or 15%, transportation expenses increased only $608,272.51, or 5%.

### FINANCIAL.

The changes in outstanding capital stock during the year, as shown by the balance sheet, were as follows:

| | Increase. | Decrease. |
|---|---|---|
| Boonville Railroad Bridge Co. | $ 600.00 | |
| Missouri, Kansas & Texas Terminal Co. of St. Louis. | 900.00 | |
| Texas Central R. R. Co., Preferred | | $ 5,000.00 |
| Texas Central R. R. Co., Common | | 10,000.00 |

| | | |
|---|---|---|
| Wichita Falls & Northwestern Ry. Co. | 700.00 | |
| Wichita Falls & Southern Ry. Co. | 900.00 | |
| Wichita Falls & Wellington Ry. Co. of Texas | 700.00 | |
| Wichita Falls & Northwestern Ry. Co. of Texas | 700.00 | |
| Wichita Falls Railway Co. | 700.00 | |
| | $5,200.00 | $15,000.00 |
| Net decrease | | $ 9,800.00 |

The changes in funded debt in the hands of the public during the year were as follows:

| | Increase. | Decrease. |
|---|---|---|
| M., K. & T. Ry. Co. Two-Year 5% Secured Gold Notes | $19,000,000 | |
| M., K. & T. Ry. Co. 5% Equipment Notes | 1,900,000 | |
| M., K. & T. Ry. Co. One-Year 5% Secured Gold Notes (Issued July 1, 1912, redeemed May 1, 1913) | 1,500,000 | $ 1,500,000 |
| W. F. & N. W. Ry. Co. 1st and Refunding Mortgage 5% Bonds | 500,000 | |
| Katy Office Building Co. 1st Mortgage 5½% Bonds | 200,000 | |
| M., K. & T. Ry. Co. Two-Year 5% Secured Gold Notes | | 16,000,000 |
| M., K. & T. Ry. Co. 5% Secured Notes | | 1,100,000 |
| Boonville R. R. Bridge Co. 1st Mortgage 5% Bonds | | 12,000 |
| | $23,100,000 | $18,612,000 |
| Net Increase | $ 4,488,000 | |

(from which $508,000 General Mortgage 4½% Gold Bonds purchased for the Sinking Fund and held by the Trustee may be deducted.)

Other changes in funded debt, as shown by the condensed balance sheet of June 30, 1913, published on pages 20 and 21, hereof, were:

| | Increase. |
|---|---|
| M. K. & T. Ry. Co. Consolidated Mortgage 5% Bonds (see page 7) | $3,146,000.00 |
| W. F. & N. W. Ry. Co. 1st Mortgage 5% Bonds | 2,213,000.00 |
| W. F. & N. W. Ry. Co. 1st Lien Collateral Trust Mortgage 5% Bonds | 873,000.00 |
| W. F. & N. W. Ry. Co. 1st and Refunding Mortgage 5% Bonds | 2,500,000.00 |
| W. F. & So. Ry. Co. 1st Mortgage 5% Bonds | 749,000.00 |
| W. F. & N. W. Ry. Co. Equipment Trust Notes | 56,490.97 |
| Net Increase | $9,537,490.97 |

$19,000,000 two-year 5% gold notes, part of an authorized issue of $25,000,000, dated May 1, 1913, due May 1, 1915, were sold during the year, the proceeds of which were used to refund $16,000,000 two-year notes, falling due May 1, and $1,500,000 one-year notes, due July 1 but called for payment May 1, and for additions to property. The present issue of $19,000,000 of these notes is secured by $24,516,000 face amount of Missouri, Kansas & Texas Railway Company consolidated mortgage 5% Gold Bonds.

It was also found advisable to create an equipment trust for $1,900,000, dated June 2, 1913, covering new equipment costing $2,376,940.65. The equipment trust notes bear 5% interest, and mature $95,000 semi-annually on June 1 and December 1 until 1923.

$3,146,000 Missouri, Kansas & Texas Railway Company Consolidated Mortgage 5% Gold Bonds were authenticated under the mortgage and delivered to your Company during the year as follows:

| | |
|---|---|
| In reimbursement of expenditures made for additions and betterments | $1,356,000 |
| In reimbursement of expenditures made for new equipment | 802,000 |
| Against M., K. & T. Ry. Co. General Mortgage Bonds retnred by Sinking Fund | 508,000 |
| Against Boonville Railroad Bridge Company First Mortgage Bonds retired by Sinking Fund | 9,000 |
| Against the pledge of First and Refunding Mortgage Bonds of Wichita Falls & Northwestern Railway Company acquired during the year | 374,000 |
| Against the pledge of Beaumont & Great Northern Railroad Stock acquired during the year | 54,000 |
| Against the pledge of First Mortgage Bonds of Missouri, Kansas & Texas Terminal Company of St. Louis, acquired during the year | 43,000 |
| **Total** | $3,146,000 |

Of the above mentioned Consolidated Mortgage bonds, $184,000 were on June 30, 1913, in your Company's treasury, $2,058,000 were pledged under the two-year notes maturing May 1, 1915, and $904,000 were pledged to secure bills payable.

## WICHITA FALLS LINES.

The acquisition of the capital stock of these companies was discussed at length in last year's annual report. The extension of 83.67 miles from Woodward to Forgan, then under construction, was completed in October last, and since November 1, 1912, the income of these lines has been included with all other lines reported. These lines have proved to be valuable feeders of traffic.

## BEAUMONT & GREAT NORTHERN RAILROAD HOUSTON & BRAZOS VALLEY RAILWAY COMPANY.

In accordance with a policy of conservative expansion to aid in the development of a constant traffic moving northward, your Company purchased during the year the entire capital stock of the Beaumont & Great Northern Railroad, which owns a line extending through the lumber district of East Texas from Livingston to Weldon, a distance of 48.3 miles, and which connects at Trinity with what is known as the Trinity Division of the Missouri, Kansas & Texas Railway of Texas; and one-half of the capital stock of the Houston & Brazos Valley Railway Company, which operates about 24 miles of road extending from Anchor to Velasco and Freeport, Texas, on the Gulf of Mexico at the mouth of the Brazos River.

The Beaumont & Great Northern Railroad has $50,000 capital stock and $883,000 of First Mortgage 5% bonds, and your Company has guaranteed the payment of principal and interest of the bonds. There is a considerable movement of tonnage from the Beaumont & Great Northern Railroad, but the full benefit of its acquisition will not be derived until a connection with the main line has been built, when the mileage and the operation of the line will be included in reports.

The Houston æ Brazos Valley Railway Company has $24,000 capital stock and $420,000 First Mortgage 5% bonds. Your Company has guaranteed principal and interest of $210,000 face amount of these bonds and has purchased an additional $92,000 face amount of them.

Freeport is a new port in process of development by a syndicate of bankers who have made heavy investments there, particularly in the installation of a plant to mine sulphur (of which large deposits have been discovered in the vicinity) by the hot water process, and who own the remaining one-half of the capital stock of Houston & Brazos Valley Railway Company. The syndicate has also planned important industrial developments at Freeport, and, in addition to the traffic incident thereto and the sulphur tonnage, a substantial interchange of traffic with steamship lines is expected eventually to develop. The Seabord & Gulf Steamship Company is now operating semi-monthly service between New York and Freeport. This transaction has also resulted in the acquisition by the Brazos Warehouse Company, the capital stock of which is owned by your Company, of 634 acres of land on the river front at Freeport.

## ROLLING STOCK.

The equipment inventory as of June 30, 1913, was as follows:

| | | |
|---|---|---|
| Locomotives | 682 | Increase 54 |
| Passenger-Train Cars | 493 | Increase 15 |
| Freight-Train and Miscellaneous Cars owned and leased | 26,872 | Increase 858 |

The average amounts expended for repairs to equipment in service were:

| | Increase. | Decrease. | Per Cent. |
|---|---|---|---|
| Locomotives | $2,422.08 | ..... | $367.34 | 13.17 |
| Passenger-Train Cars | 777.67 | $218.41 | ..... | 39.05 |
| Freight-Train Cars | 53.71 | 9.99 | ..... | 22.85 |

42 locomotives, or 6% of the number owned, and 750 freight cars, or 2.9% of the number owned, were undergoing or awaiting heavy repairs at the close of the year.

The average tractive power of locomotives in service increased 1752 pounds or 6.66%. The average capacity of freight cars in service increased 290 pounds, or .5%.

There was expended during the year for the purchase of equipment, less the value of equipment retired, a net amount of $1,506,667.35.

## ROADWAY AND STRUCTURES.

The roadway has been fully maintained. The expenditure for permanent additions and betterments, exclusive of equipment, aggregated $2,454,801.74, a statement of which appears on page 22.

Considerable headway has been made in general improvement work, from the standpoint of securing additional revenue and of effecting economies in operation.

The policy of renewing with heavier steel the light rail on the various portions of the line has been continued, a total of 155 miles of new 85 lb. rail having been laid during the year.

In pursuance of the general plan of renewing wooden trestles and culverts in concrete, 450 structures of this character have been so renewed, a total of 20,220 cubic yards of concrete having been used; and considerable concrete abutment work in connection with steel bridges has been done.

Steel bridge work has been installed at several places on the Fort Worth, Houston and San Antonio Divisions and on the Texas Central Railroad, replacing pile trestles and steel work of lighter construction. Other bridges on the lines between Sedalia and Red River and Kansas City and Parsons, including the Missouri River bridge at Boonville, have been strengthened to permit the use of heavier engines which have recently been acquired, which will result in the handling of increased tonnage per train over that section of the line. The work of strengthening bridges in a similar manner between Denison and Houston is in progress, which will permit the use of these heavier engines over the main lines in Texas. Trestles have also been strengthened on the Texas Central Railroad, and on the Wichita Falls Lines between Frederick and Newcastle.

194 miles of embankment were widened and ditching was done on 156 miles of roadway.

50 miles of new ballasting was done and 242 miles of track re-ballasted.

1,966,657 cross ties and 945 sets of switch ties were used during the year.

32 miles of new fence were constructed and 362 miles of fence rebuilt.

51 miles of yard and industrial tracks were constructed.

New division terminals at Waco have been completed and put in operation.

A reduction of grade from one per cent to five-tenths of one per cent was made near West and Hillsboro, Texas, which permits an increase in the maximum tonnage handled by large engines southbound from 2500 to 3500 tons.

The double track work between Waco and Hewitt, Texas, 7.6 miles, which will facilitate train movement, has been completed since the close of the year.

A passenger station and office building at Parsons, Kansas, to replace the one destroyed by fire, is being constructed.

A new passenger station is under construction at Houston, Texas. That city has recently built a viaduct between the north and south sides of the town, passing over your Company's tracks at a point near the site of the new station.

New stations have also been constructed at Evansville, Franklin Junction, Humbolt, Crowder, Canadian, Sherman City, Cleveland, Nelagony, Winnsboro, Newsome, Burrows, Temple, Taylor, Hico and Albany, and many other betterments made.

Substantial improvements have been made in the water supply at different points, which are producing satisfactory operating results. Further improvements of this nature will be made as rapidly as the problems can be workede out.

Extensive changes are being made in the freight station at Saint Louis, which should result in a considerable saving in the cost of handling freight at that terminal.

At Dallas a new general office building has been acquired, the purchase involving the assumption by The Missouri, Kansas & Texas Railway Company of Texas of the payment of principal and interest of $200,000 First Mortgage 5½% bonds issued by the Katy Office Building Company.

The Union Terminal Company of Dallas, which was organized last year, has made very good progress in the acquisition of land and franchises for a passenger terminal, and plans are now being prepared for the building and track layout.

Work on the Kansas City Union Station has been delayed by strikes and other causes, but it should be ready for service during the coming year.

The growth of your Company's business during the past few years has been such that the terminal facilities at several of the more important points have been outgrown, and it will soon be necessary to provide increased facilities.

## GENERAL REMARKS.

The Federal Congress enacted a law requiring the Interstate Commerce Commission to ascertain the value of the railroads of the United States. This is the most stupendous work of its kind ever undertaken by any Government, and it is of vital importance to the companies. It involves the solution of many complex problems, and agreement upon principles and elements of value about which there exists a remarkable diversity of opinion and confusion of thought. Your Company has appointed a Valuation Committee to prepare the necessary data and to co-operate with the Interstate Commerce Commission in arriving at the value of your Company's property. The cost of this work, both to the railroads and to

the Government, will necessarily be a considerable sum, and the work will probably be in progress for several years.

The United States Supreme Court decided adversely the suit of the Missouri railroads against that state seeking to restrain the operation of laws which established a maximum passenger rate of two cents a mile and fixed maximum freight rates on certain commodities. The reduced rates, accordingly, were made effective July 4, 1913.

It also became necessary for your Company and other companies operating in Oklahoma to enter into stipulations with the Attorney General of Oklahoma providing for dissolution of the temporary injunctions which had been secured against the enforcement of the two-cent passenger rate fixed by the constitution of that state, and the two-cent rate was made effective on July 3, 1913, pending final determination (including the matter of prior liability, if any) of the litigation on its merits.

Safety committees have been organized during the year under the direction of a commissioner of safety, for the purpose of educating the employes in the use of greater care in avoiding accidents.

Mr. Adrian H. Joline died on October 15, 1912. At the time of his death, he was Counsel for the Company at New York, and prior thereto had been Chairman of the Board and President of the Company.

At the annual meeting of the stockholders on April 10, 1913, Messrs. Frank H. Davis and Horace E. Andrews, of New York, were elected Directors to fill the vacancies caused by the resignations of Messrs. A. A. Allen and Alfred Waldron Smithers.

Mr. C. N. Whitehead, formerly Secretary and Treasurer, having been appointed by the President to act as his Assistant, the Directors at their annual meeting in April appointed Mr. Carl Remington as Secretary and Mr. Frank Johnson as Treasurer of the Company.

Statements and tables of accounts and operations are appended to this report.

Appreciative acknowledgment is hereby made of efficient services during the year of officers and employees.

By order of the Board of Directors.

FRANK TRUMBULL, *Chairman.*

C. E. SCHAFF, *President.*

## MISSOURI, KANSAS & TEXAS LINES.
## PROFIT AND LOSS ACCOUNT.

*Table 3.*

| | | |
|---|---|---|
| Balance to Credit of Profit and Loss, June 30, 1912 | | $4,729,386.16 |
| *Additions:* | | |
| Balance for Year Brought Forward from Income Account | | 2,316,985.47 |
| Adjustment of Value of Texas Central R. R. Co. Equipment as of November 30, 1912 | | 232,401.20 |
| Miscellaneous | | 8,492.41 |
| Total | | $7,287,265.24 |
| *Deductions:* | | |
| Depreciation prior to July 1, 1907, on equipment destroyed | | 108,324.85 |
| Side tracks and other property abandoned | | 32,663.24 |
| Discount and expenses of security issues | | 908,724.18 |
| Uncollectible accounts charged off | | 27,625.29 |
| Dividends: | | |
| M. K. & T. Ry. Co. preferred stock 4% | $520,000.00 | |
| Texas Central R. R. Co. preferred stock outstanding 5% | 875.00 | |
| Texas Central R. R. Co. common stock outstanding 5% | 135.00 | |
| Wichita Falls & Northwestern Ry. Co. common stock outstanding 6% | 42.00 | 521,052.00 |
| Southwestern Coal & Improvement Co. Sinking Fund transferred to "Appropriated Surplus" | | 15,539.80 |
| Texas Central R. R. Co. Profit and Loss balance June 30, 1910, taken up in Annual Report Profit and Loss Statement fiscal year 1911, now deducted | | 450,188.49 |
| | | $2,064,117.85 |
| Balance to credit of Profit and Loss, June 30, 1913 | | $5,223,147.39 |

## MISSOURI, KANSAS & TEXAS LINES.
## CONDENSED GENERAL BALANCE SHEET.
## JUNE 30, 1913.

*Table 4.*

### ASSETS.

| | | | |
|---|---|---|---|
| *Property Investment:* | | | |
| Cost of Road and Equipment | $222,618,295.86 | | |
| Less Accrued Depreciation on existing Equipment (Credit) | 1,048,906.84 | $221,569,389.02 | |
| Securities of Proprietary, Affiliated and Controlled Companies—Pledged | $698,461.00 | | |
| Miscellaneous Investments | 185,711.55 | 884,172.55 | $222,453,561.57 |
| *Securities Issued or Assumed Pledged:* | | | |
| Consolidated Mortgage Bonds (See Contra) | | | 25,420,000.00 |
| *Special Funds:* | | | |
| Special Deposit account of Equipment Trust | | | 1,062,558.45 |
| | | | $248,936,120.02 |
| *Working Assets:* | | | |
| Cash | $1,502,733.02 | | |
| Loans and Bills Receivable | 883,512.31 | | |
| Traffic and Car Service Balances due from other Companies | 817,809.46 | | |
| Net Balance due from Agents, Train Auditors and Conductors | 260,855.41 | | |
| Miscellaneous Accounts Receivable | 1,805,200.61 | | |
| Material and Supplies | 3,137,206.51 | | |
| Other Working Assets | 34,892.75 | $8,442,210.07 | |
| *Securities in Treasury—Unpledged:* | | | |
| Securities of Proprietary, Affiliated and Controlled Companies | $417,420.30 | | |
| Securities Issued or Assumed | 201,043.00 | | |
| Marketable Securities | 178,084.39 | 796,547.69 | |
| *Accrued Income Not Due:* | | | |
| Unmatured Interest, Dividends and Rents Receivable | | 15,202.30 | |
| *Deferred Assets:* | | | |
| Working Funds—Advanced | $ 60,566.53 | | |
| Rents and Insurance paid in advance | 45,119.96 | | |
| Cash and Securities in Sinking and Redemption Funds | 1,460,000.88 | | |
| Cash and Securities in Provident Funds | 111,283.83 | | |
| Other Deferred Debit Items | 324,402.72 | 2,001,373.92 | 11,255,333.98 |
| *Total* | | | $260,191,454.00 |

### LIABILITIES.

| | | | |
|---|---|---|---|
| Common Stock, M. K. & T. Ry. Co., held by the public | $ 63,283,257.00 | | |
| Preferred Stock, M. K. & T. Ry. Co., held by the public | 13,000,000.00 | | |
| Common Stock, M. K. & T. Ry. Co., held by the Company | 17,043.00 | | |
| Stock, Subsidiary Companies (Page 24) | 25,400.00 | $76,325,700.00 | |
| *Funded Debt:* | | | |
| Bonds and Notes (Page 24) | | 140,769,990.97 | $217,095,690.97 |
| Consolidated Mortgage Bonds (see Contra) | $ 25,420,000.00 | | |
| Consolidated Mortgage Bonds in Treasury | 184,000.00 | | |
| General Mortgage Bonds in Sinking Fund | 1,415,000.00 | | 27,019,000.00 |
| | | | $244,114,690.97 |
| *Working Liabilities:* | | | |
| *Loans and Bills Payable | $ 1,516,385.55 | | |
| Traffic and Car Service Balances due to other Companies | 938,608.04 | | |
| Audited Vouchers Unpaid | 2,717,335.40 | | |
| Audited Wages Unpaid | 1,213,847.77 | | |
| Miscellaneous Accounts Payable | 273,210.13 | | |
| Matured Interest, Dividends and Rents Unpaid | 640,399.19 | | |
| Matured Mortgage and Secured Debt Unpaid | 17,000.00 | | |
| Other Working Liabilities | 45,297.76 | $ 7,362,083.84 | |
| *Deferred Liabilities:* | | | |
| Unmatured Interest, Dividends and Rents | $ 1,122,722.92 | | |
| Taxes Accrued | 390,766.54 | | |
| Liability on account of Provident Funds | 111,283.83 | | |
| Other Deferred Credit Items | 82,161.72 | 1,706,935.01 | 9,069,018.85 |
| *Appropriated Surplus:* | | | |
| Additions to Property since June 30, 1907, through Income | $ 1,563,429.84 | | |
| Reserves Invested in Sinking and Redemption Funds | 221,166.95 | $ 1,784,596.79 | |
| *Profit and Loss Balance* | | 5,223,147.39 | 7,007,744.18 |
| *Total* | | | $260,191,454.00 |

| | |
|---|---|
| The Company is also guarantor of Kansas City Terminal Railway Company First Mortgage Bonds, due 1960 (jointly with eleven other Railway Companies) | $30,094,000.00 |
| Of Joplin Union Depot Company First Mortgage Bonds, due 1940 (jointly with three other Railway Companies) | 650,000.00 |
| Of Houston & Brazos Valley Railway First Mortgage Bonds, due 1937 | 210,000.00 |
| Of Beaumont & Great Northern Railroad First Mortgage Bonds, due 1939 | 883,000.00 |
| Of Galveston, Houston & Henderson R. R. Co. Note (jointly with International & Great Northern R. R. Co.) | 133,000.00 |

*$800,000 paid to November 1, 1913.